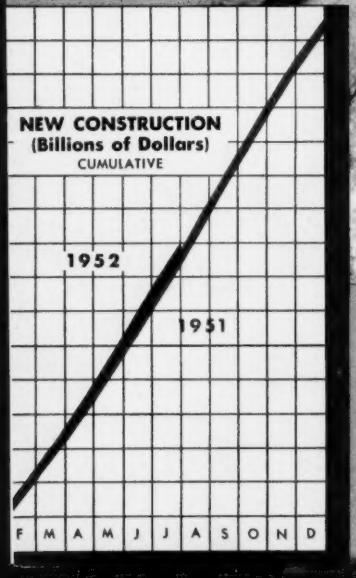
The CONSTRUCTOR

OFFICIAL PUBLICATION OF THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

Volume XXXIV SEPTEMBER 1952 Number 9

- BUILDINGS
- HIGHWAYS
- AIRPORTS
- RAILROADS

PUBLIC WORKS



Controls Relaxations Set for April 1, 1953—21

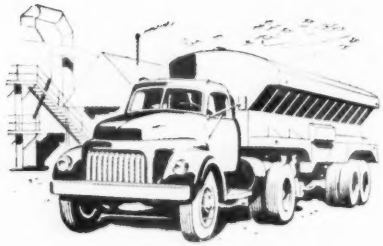
Hazards of Projects Overseas Highlighted—25

Construction Market to Continue Strong—29

Eaton 2-Speeds cut hauling costs

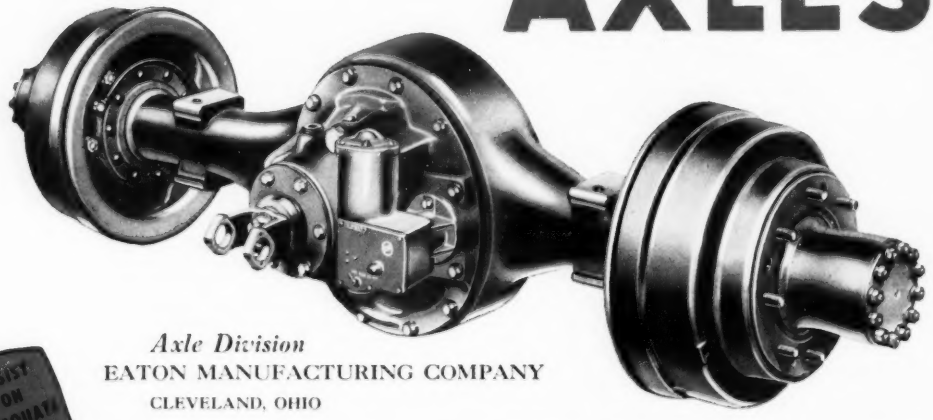
Eaton 2-Speed Axles provide a gear ratio for every load and road situation; permit engines to run in the most economical speed range; reduce stress and wear on engines and power transmitting parts. This means lower cost right down the line: through reduced operating and maintenance costs, through faster trips, through longer truck life. And Eaton 2-Speed Axle trucks are worth more on the trade-in.

Let your truck dealer explain how Eaton's exclusive planetary gearing, forced-flow lubricating system, and positive shift control keep trucks on the job without expensive axle repairs.



EATON

2-Speed Truck AXLES



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

INSIST ON ADEQUATE ROADS

Today, America's roads are crowded with twice the traffic they were designed to carry. Help end the national traffic jam by speaking up for more and better roads.

Chicago—A truckload of fabricated Ryerson re-bars is delivered to the site of the 21-story Lake Shore-Briar Apartment Building, foreground. Construction is just beginning on this job while, in the background, the 22-story Darien Apartments, also built with Ryerson reinforcing, near completion. Contractor for the Darien Apartments is Sumner S. Sollitt Construction Co. The architects: Loebl, Schlossman & Bennett. For the Lake Shore-Briar Building (foreground) the general contractor is Crane Construction Co. and the concrete work is being done by Carl F. Erickson Co. The architects: Shaw, Metz & Dolio.

Two More Big Jobs Rely On Ryerson Re-Bar Service

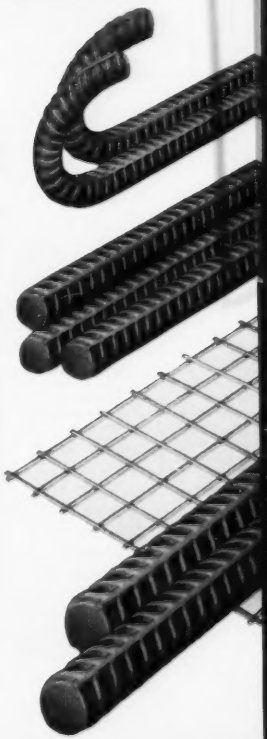
Contractors for these two ultra-modern apartment buildings—*and hundreds more builders from coast-to-coast*—take advantage of Ryerson construction steel service to help start jobs fast and stay on schedule.

Though some shortages have developed as a result of the steel strike, you can usually count on us for scheduled deliveries of the bars you need, plus spirals, wire mesh and reinforcing accessories.

Time-saving Ryerson reinforcing service also includes setting plans, when desired, accurate cutting and bending, and the metal tagging of every piece for quick identification and placement. On your next job call on us for a lump sum or average pound price.

Construction Steel In Stock

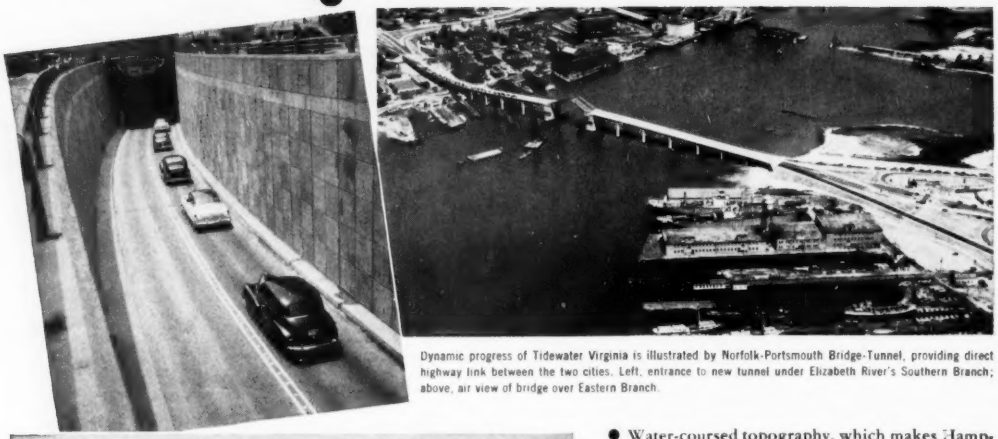
- **REINFORCING BARS** and accessories
- **STRUCTURALS**—channels, angles, beams, etc.
- **PLATES**—Many types including Inland 4-Way Safety Plate
- **SHEETS**—many types & coatings
- **TUBING**—incl. welded structural
- **EXPANDED METAL**—std. & flattened
- **STEEL SPIRALS, CAISSON RINGS, ETC.**



RYERSON STEEL

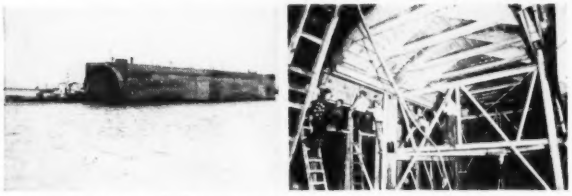
JOSEPH T. RYERSON & SON, INC. STEEL SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

New Day IN THE Old Dominion

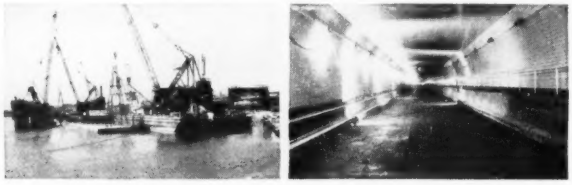


Dynamic progress of Tidewater Virginia is illustrated by Norfolk-Portsmouth Bridge-Tunnel, providing direct highway link between the two cities. Left, entrance to new tunnel under Elizabeth River's Southern Branch; above, air view of bridge over Eastern Branch.

Tunnel Building Takes Pinpoint Precision and Heavy Construction Muscle



Elizabeth River Tunnel is tenth of trench type in U. S., fourth of its kind built by Merritt-Chapman & Scott. For 2117' under-water section, 7 double-shelled steel tubes, each about 300' long, 35'4" diameter, were launched and towed to site. Next step was to concrete 18" inner ring and 22'-wide roadway inside each section, piping concrete through hatchways along top into traveller forms. Then hatchways were concreted and sealed.



Almost awash, tubes are held by derrick slings, as concrete is tremied into place between inner and outer shells, until tubes lose buoyancy. Tube's 9100 tons "in the dry" becomes less than 100 tons under water. Divers bolt sections together, rest of space between inner and outer shells is filled, and section joints sealed, with concrete. Trench is back-filled, bulk-heads holed through, joints faced with concrete—and here's your tunnel!

● Water-coursed topography, which makes Hampton Roads one of the world's great harbors, has long handicapped land transportation. A key project in solving this problem is the Norfolk-Portsmouth Bridge-Tunnel and related facilities, completed at a cost of $23 million.

The trench-type tunnel, 3,315 ft. long, under the Southern Branch of the Elizabeth River is linked with a beautiful, new four-lane bridge, 2,135 ft. long, over the Eastern Branch.

Motorists who now travel swiftly between Norfolk and Portsmouth, instead of waiting for traffic-glutted ferries, are the first to appreciate the engineering and construction know-how which went into this great project.

For one thing, the logistics of a job like this are an achievement of first rank. Clock-like co-ordination meshed men, equipment and materials together as one team. And, team-player that it is, Lone Star delivered 179,233 barrels of cement on the dot of every promise, for the very good reason that . . .

With Lone Star, dependable service goes hand in hand with always-dependable quality.

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Contractors:
MERRITT-CHAPMAN & SCOTT CORPORATION, New York
(Tunnel and Ventilation Building)
TIDEWATER CONSTRUCTION CORPORATION, Norfolk
(Bridge and Approaches)
STERLING FOUNDATIONS, INC., Lynbrook, N. Y.
(Sub-contractor Cut-and-Cover Tunnel Section, Portsmouth)
AMES & WEBB, INC., Norfolk
(Virginia Highway Dept. contract for widening and paving feeder streets)
Ready-Mix Lone Star Concrete:
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The CONSTRUCTOR

BUILDINGS • HIGHWAYS • AIRPORTS • RAILROADS • PUBLIC WORKS

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COVER

B-47 war birds of Uncle Sam, undergoing refinement at Tucson, Ariz., now nestle on 15 in. reinforced taxi ramps containing enough concrete to erect a three-story building a block square. The 12,000 ft. landing strip, longest at any municipal airport west of the Mississippi, was built by the Del E. Webb Constr. Co., and the San Xavier Rock and Sand Co., Tucson, on what was formerly raw desert and has $3\frac{1}{2}$ to 4 in. of asphalt over 20 in. of compacted soil. This month's cover shows a general view of the pouring of the warmup and parking apron at the southeast end of runway. Note reinforcing dowels indicating position of the joints in the thick concrete ramps. Story and more pictures on page 50.

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C.I.T. CORPORATION

Industrial Financing

ONE PARK AVENUE, NEW YORK 16, N. Y.

S. D. MADDOCK
PRESIDENT

September, 1952

Dear Mr. Contractor:

The heavy work-load of a big construction year has left its mark upon the construction equipment of many contractors.

As the slower season approaches in many sections of the country, contractors make good use of this time to look over their equipment fleet and find out what modernized and new or replacement units their organization must have. The units of time and labor-saving machinery that will help to get your fair share of next spring's contracts can be financed now with payments suited to your income.

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Major relaxations of construction controls, planned for latter half of 1952, but delayed by steel strike, will become effective April 1, 1953, NPA told the Construction Industry Advisory Committee Aug. 26. However, the government agency agreed to consider at another meeting of the task group on Oct. 29 the possibility of easing the controls earlier "in the light of the materials supply situation at that time." (page 21)

Industrial production quickly recovered from the effects of steel strike and is now back to pre-strike output, the Federal Reserve Board reported last month. In its national summary of business conditions, the Board estimated August production at about 212% of the 1935-39 average, the same as it was in May. In June, the first month of the strike, the index fell to 204% and in July to 191%, the lowest in two years.

Continued strength in construction and building materials industries and the real estate market was forecast last month by the Federal Reserve Board. Salient points in the Board's report based on record level of new construction, buyers' intentions, output of building materials, high level of costs and wages in the industry, extension of home mortgage credit in large volume and the high rate of new home starts. (page 29)

Hazards to overseas' contracting were highlighted by last month's interim report on the Moroccan airbase investigation by the Preparedness Investigating Subcommittee of the Senate Armed Services Committee. Although the report was far more critical of government agencies than the contractor, it damaged reputations of contractors and the entire industry. It went out of its way to blast at the concept of joint ventures which have made possible the fast construction of giant projects. (page 25)

Bidding procedure improvements, recommended to Navy's Bureau of Yards and Docks by a task unit of The Associated General Contractors of America, have brought about "better than anticipated results," Rear Admiral J. F. Jelley announced this month. Navy had been inviting bids for a project plus a large number of alternate items, resulting in the low man on the basic bid sometimes losing out. Public works officers recently have been including in the basic bid item only such work as could be reasonably expected to be procured within funds available. (page 22)

Frank R. Creedon resigned his post as assistant administrator in charge of facilities and construction for NPA to become director of installations in the Defense Department late last month. Mr. Creedon, in his new post, will maintain surveillance for the Secretary of Defense over the planning and construction of all public works projects carried out by branches of the armed services. (page 22)

Atomic energy plant construction expected to hit its peak this month with a volume of $128 million—almost 5% of the nation's total monthly new construction. Long-range plans of atomic expansion are materializing under contract awards for record-breaking amounts. Second largest contract ever awarded went last month to Peter Kiewit Sons' Co., Omaha, to build a $1.2 billion plant in Pike County, Ohio. This followed closely contract awards totaling $923 million for expansions at Oak Ridge, Tenn., and Paducah, Ky. (page 31)

Mid-year board meeting of the A.G.C., the largest in its history, was held at the Greenbrier, White Sulphur Springs, W. Va., Sept. 8-10. The A.G.C. of West Virginia, Carolinas Branch and Virginia Branch were hosts of the meeting which considered the principal problems faced by construction firms in carrying out current and future defense and civilian projects. Also discussed was the record-breaking construction rate for the first 7 months of the year, government controls, contracts and specifications, labor relations and the availability of materials.

Centennial of Engineering which opened in Chicago last month was attended by many general contractors, and several A.G.C. officials and members participated in the sessions. A joint luncheon and meeting was held by the A.G.C. and A.S.C.E. Construction Division Sept. 3, which was addressed by Managing Director H. E. Foreman, Past President Dwight W. Winkelman and Director Lester C. Rogers.

Development of construction industry and contract method in the U. S. was outlined by Mr. Foreman in comprehensive paper tracing the industry through the ages. In comparing historic projects of earlier civilizations dwarfed by construction feats considered standard today, he noted the tremendous strides made possible by concerted efforts of all segments of the industry. (page 53)

Opportunities to engineers offered by construction were listed by Mr. Winkelman who stressed need for civil engineers. He noted the lack of construction courses in colleges during prewar days, but said educators are recognizing their value more and more today. (page 72)

Labor-management problems in the construction industry were analyzed by Lester C. Rogers before the same joint session of the A.S.C.E. Construction Division and the A.G.C. Mr. Rogers, who has long been active in A.G.C. labor relations affairs, commented on the birth of the Taft-Hartley Act and later the National Joint Board for Settlement of Jurisdictional Disputes as attempts to solve labor problems. (page 78)

Modular coordination pioneers are "astonished" by gains in project begun 14 years ago which they thought would progress much more slowly. About 50% of total brick and tile production has converted or is in process of converting to modular. (page 42)

Press of toll road issue is reflected in report of American Association of State Highway Officials' special committee on subject suggesting that officials refrain from taking a firm stand on toll financing. (page 49)

New co-chairman of the Construction Industry Stabilization Commission is Duncan Campbell, the Wage Stabilization Board announced last month. Mr. Campbell replaces Archibald Cox who is now chairman of the WSB. Laurence E. Seibel was named a public member to the commission.

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When drilling in ordinary ground, use Timken multi-use bits. With correct and controlled reconditioning, they give you the lowest cost per foot of hole when full increments of steel can be drilled.

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A Series of Graphs Outlining the Construction Trend

Compiled by The Associated General Contractors of America

TREND OF CONSTRUCTION COSTS

The average of construction costs in the principal construction centers of the United States for August stands at Index Number 393, according to the A.G.C. Index. The cost figure for August 1951 was 378. The 1913 average equals 100.

WAGE AND MATERIAL PRICE TRENDS

The average of wages in the principal construction centers of the United States stands at 545 for August. One year ago the average stood at 506. The average prices paid by contractors for basic construction materials for August stand at Index Number 292. The average a year ago stood at 294. The 1913 average, again, equals 100.

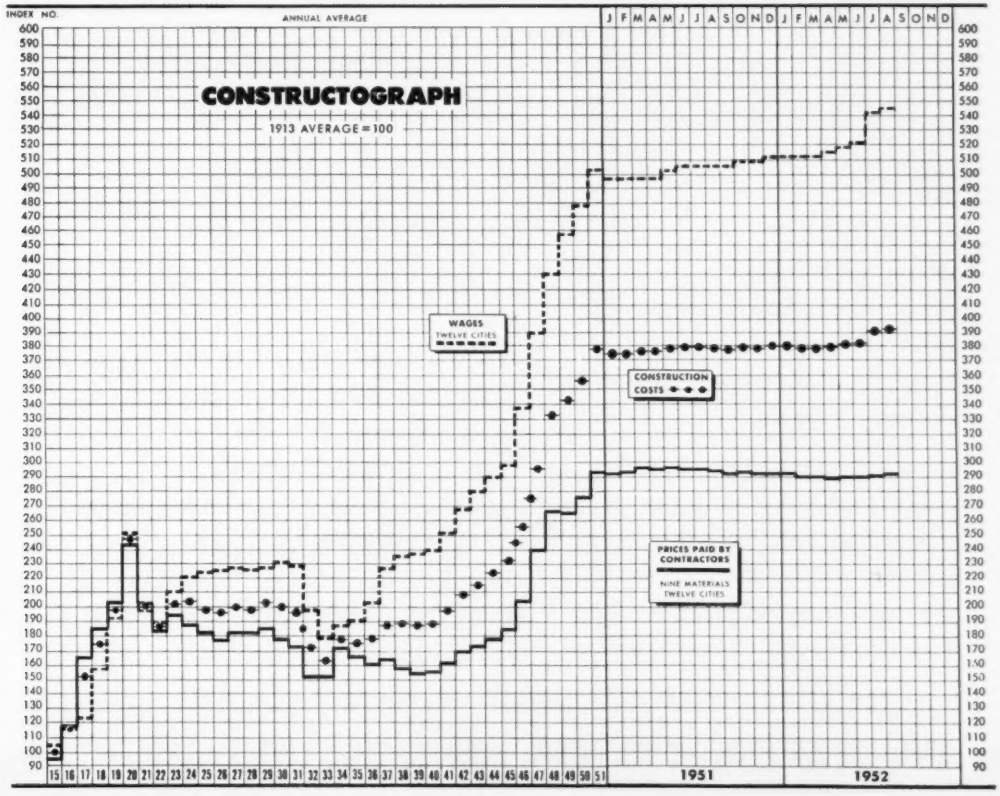
CONTRACT AWARDS IN 37 STATES

The volume of contracts awarded during July (Index Number 293, based on 1936-1938) is a decrease of 3 points from June and an increase of 17 points from July 1951.

REVENUE FREIGHT LOADINGS

Revenue freight loaded during the first 34 weeks of 1952 totaled 23,927,043 cars. For the same period in 1951, loadings amounted to 26,202,372 cars. This represents a decrease of 8.6%.

● Wage, Material Price and Construction Cost Trends



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The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

(NOTE: August volume figures have been delayed pending further information on effects of the steel strike)

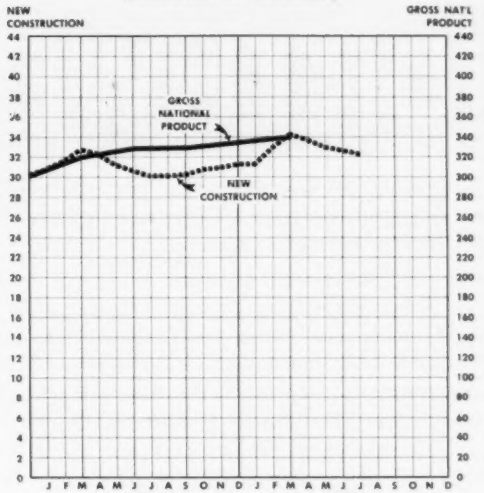
● TOTAL Construction compared with Gross National Product

(BILLIONS OF DOLLARS)

DATA SUPPLIED BY DEPT. OF COMMERCE

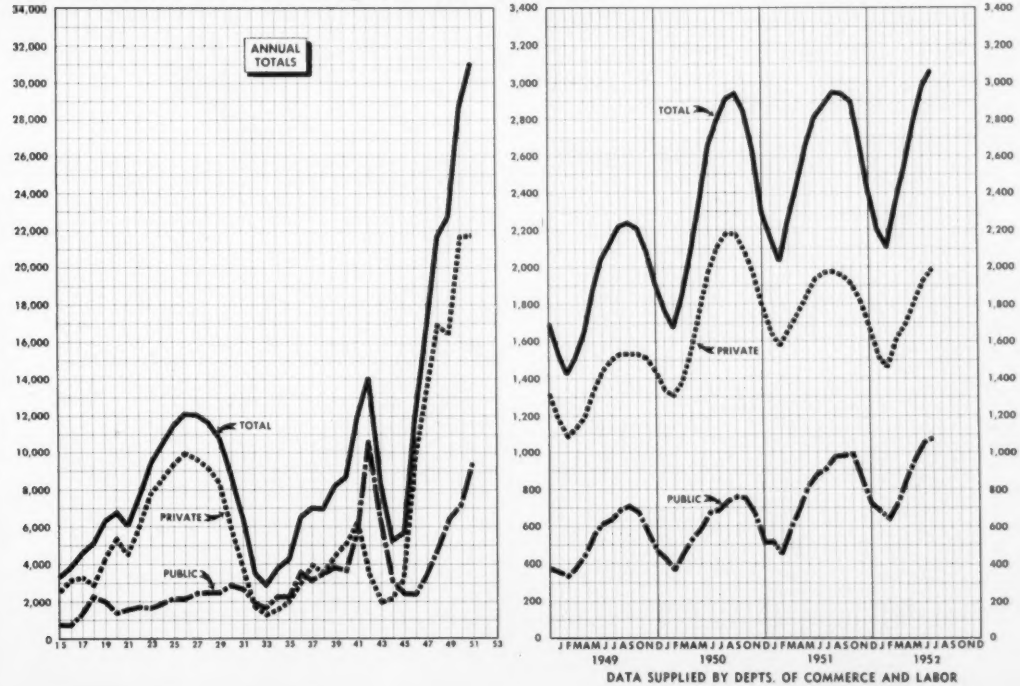
● NEW Construction compared with Gross National Product*

(BILLIONS OF DOLLARS)



** Seasonally adjusted at an annual rate*

New Construction Activity (MILLIONS OF DOLLARS)



DATA SUPPLIED BY DEPTS. OF COMMERCE AND LABOR

BROWN & ROOT, INC., Houston, Texas
are operating their FORTY-SEVENTH

NORTHWEST 47

● Advertising can talk superiority but repeat orders prove it! — and there is a lot of proof in forty-seven orders for one make of equipment.

Maybe you have wondered about Northwest Advantages — Northwest Steering, Northwest Uniform Pressure Swing Clutches, the Northwest Cushion Clutch, the Northwest Dual Independent Crowd, Northwest cast steel machinery bases and machinery side frames — and all the other Northwest features. If you are still wondering, take a look at the successful contractors that have bought Northwests year after year, (remember, these people have used other makes of equipment) and ask yourself why do they buy Northwests over and over again?

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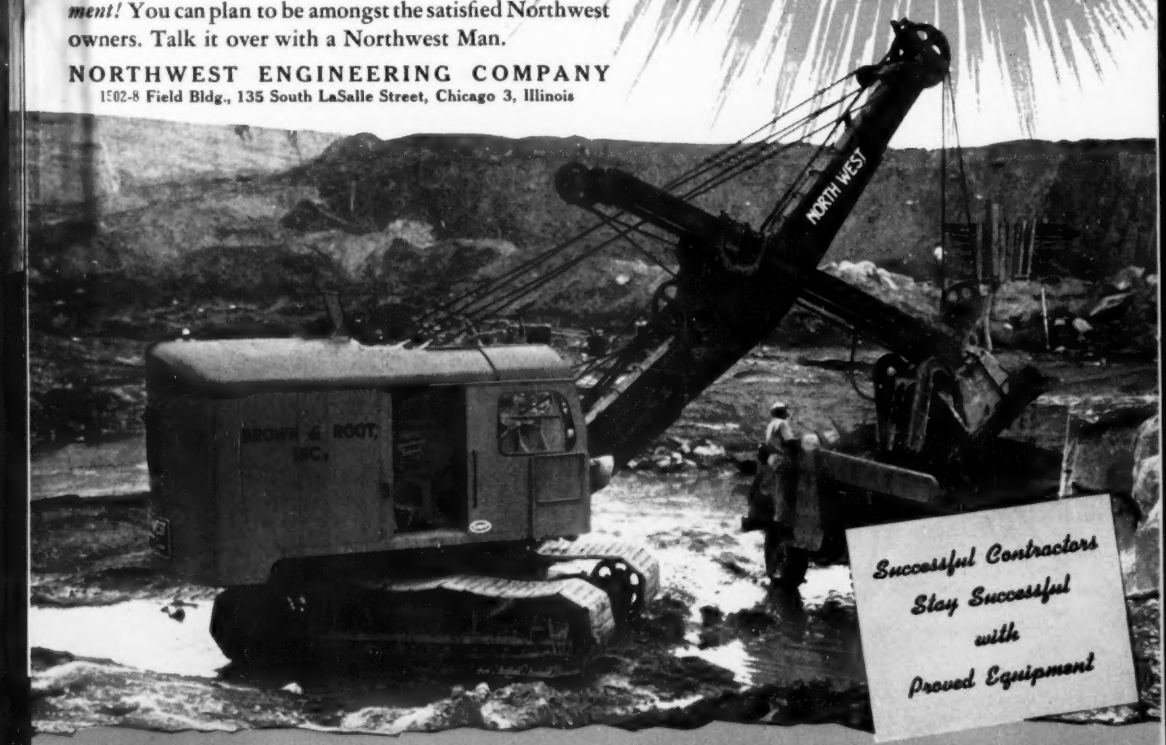
. . . ADVERTISING can talk Superiority — REPEAT ORDERS prove it!



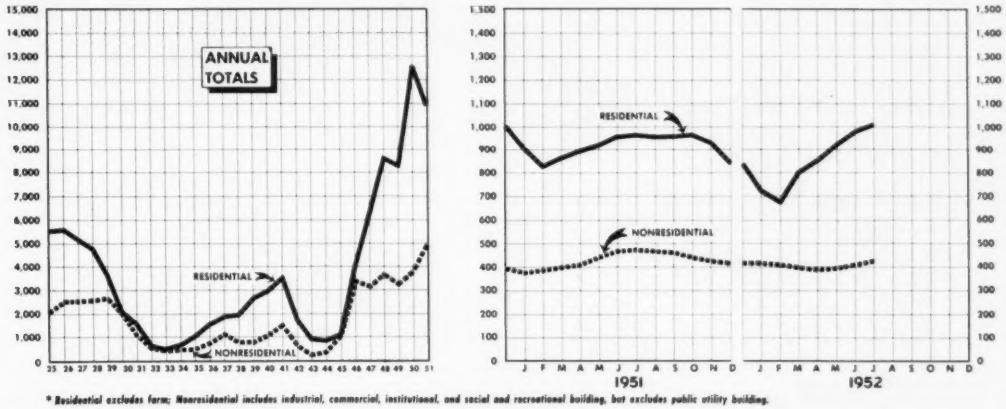
Successful Contractors Stay Successful with Proved Equipment

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

(NOTE: August volume figures have been delayed pending further information on effects of the steel strike)

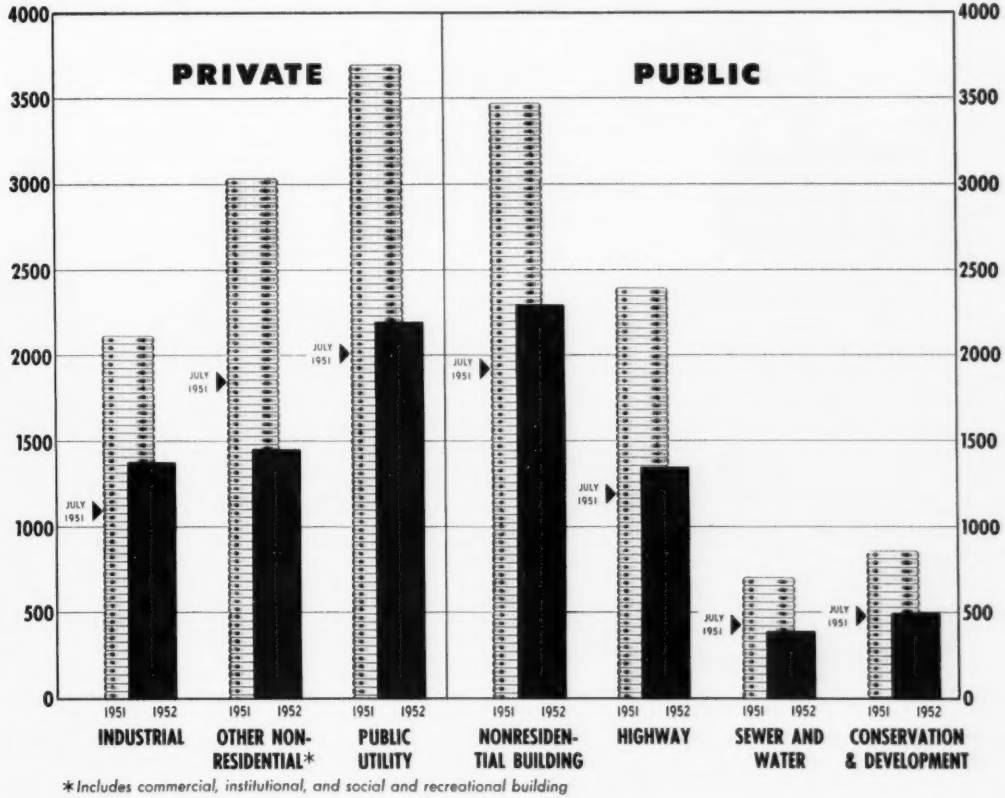
NEW CONSTRUCTION ACTIVITY

● Private Residential and Nonresidential Building* (MILLIONS OF DOLLARS)



* Residential excludes farm; Nonresidential includes industrial, commercial, institutional, and social and recreational building, but excludes public utility building.

● Selected Types: (CUMULATIVE, MILLIONS OF DOLLARS) 1951 and 1952 VOLUME THROUGH JULY



*Includes commercial, institutional, and social and recreational building

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Every CUMMINS DIESEL is built not once but twice

Construction men in the field have learned to count on Cummins Diesels for dependable power day in, day out.

What's behind this consistent reliability? One good reason is the fact that every Cummins Diesel is actually built *twice*. After initial assembly, and run-in testing, every engine is disassembled, inspected; then reassembled and tested again.

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***Leaders** in lightweight, high-speed diesel power!*

For Moderate Income Families in Large Cities

(Formerly referred to as the "Cost of Living Index," compiled by the Bureau of Labor Statistics)

THIS table indicates the average changes in retail prices of selected goods, rents and services bought by the average family of moderate income from May 15, 1950 to July 15, 1952.

They are presented here for use by employers who may wish to take these cost of living data into consideration when contemplating adjustments of wages based on increased living costs.

The Bureau of Labor Statistics surveys 10 key cities every month and 24 other large cities quarterly. Prices are obtained on food, fuel, apparel, house furnishings and miscellaneous goods and services. Rental information is obtained quarterly only for all cities. The computations are based on the indexes for the years 1935-39, which are taken as the average of 100 points.

	1950			1951			1952		
	MAY 15	JUNE 15	JULY 15	MAY 15	JUNE 15	JULY 15	MAY 15	JUNE 15	JULY 15
Average	168.6	170.2	172.5	185.4	185.2	185.5	189.0	189.6	190.8
Birmingham, Ala.	169.0	171.1	175.7	190.1	189.8	189.2	194.2	194.5	196.7
Mobile, Ala.	.....	167.4	.....	.....	183.5	.....	.....	188.4	.....
Los Angeles, Calif.	166.7	166.7	168.2	186.3	186.1	186.7	191.3	191.9	192.1
San Francisco, Calif.	.....	173.1	.....	.....	188.4	.....	.....	196.3	.....
Denver, Colo.	.....	.....	169.5	.....	.....	187.6	.....	.....	192.8
Washington, D. C.	165.2	.....	.....	180.0	.....	.....	184.9	.....	.....
Jacksonville, Fla.	.....	176.7	.....	.....	190.6	.....	.....	198.2	.....
Atlanta, Ga.	169.3	.....	.....	192.7	.....	.....	194.4	.....	.....
Savannah, Ga.	.....	.....	177.2	.....	.....	196.5	.....	.....	202.0
Chicago, Ill.	175.3	176.4	179.2	189.8	190.1	190.9	194.7	195.6	195.9
Indianapolis, Ind.	.....	.....	175.1	.....	.....	186.8	.....	.....	192.1
New Orleans, La.	171.5	.....	.....	188.5	.....	.....	190.1	.....	.....
Portland, Me.	.....	164.5	.....	.....	176.4	.....	.....	182.3	.....
Baltimore, Md.	.....	174.3	.....	.....	189.8	.....	.....	194.2	.....
Boston, Mass.	163.3	166.2	168.4	176.1	176.5	176.9	179.9	180.4	183.1
Detroit, Mich.	171.4	174.2	176.2	187.4	188.3	188.6	191.8	192.3	193.5
Minneapolis, Minn.	.....	169.2	.....	.....	183.6	.....	.....	190.3	.....
Kansas City, Mo.	.....	.....	166.1	.....	.....	179.7	.....	.....	185.6
St. Louis, Mo.	.....	169.7	.....	.....	185.0	.....	.....	192.7	.....
Manchester, N. H.	.....	.....	173.1	.....	.....	184.4	.....	.....	190.2
Buffalo, N. Y.	.....	.....	172.0	.....	.....	185.5	.....	.....	189.9
New York, N. Y.	165.4	167.0	170.0	181.4	180.5	181.2	183.2	183.6	185.9
Cincinnati, Ohio	169.7	171.2	173.4	184.8	185.0	185.6	189.4	190.1	190.9
Cleveland, Ohio	170.1	.....	.....	188.2	.....	.....	192.7	.....	.....
Portland, Ore.	.....	.....	179.2	.....	.....	195.7	.....	.....	198.6
Philadelphia, Pa.	167.1	169.7	171.5	186.4	185.6	185.4	188.3	189.1	191.1
Pittsburgh, Pa.	172.0	173.4	174.9	187.8	187.8	189.3	191.1	190.8	192.1
Scranton, Pa.	167.3	.....	.....	182.4	.....	.....	186.3	.....	.....
Memphis, Tenn.	.....	169.9	.....	.....	187.8	.....	.....	191.2	.....
Houston, Tex.	172.4	173.1	175.1	192.0	192.3	192.6	194.3	194.6	195.1
Norfolk, Va.	170.9	.....	.....	188.3	.....	.....	192.9	.....	.....
Richmond, Va.	.....	.....	168.1	.....	.....	181.3	.....	.....	185.8
Seattle, Wash.	171.8	.....	.....	191.4	.....	.....	195.8	.....	.....
Milwaukee, Wis.	170.9	.....	.....	190.9	.....	.....	198.1	.....	.....

Allis-Chalmers HD-20 Tractor

gives HIGHER OUTPUT—

Exclusive Hydraulic Torque Converter Drive Is One BIG Reason Why

The hydraulic torque converter drive, *exclusive* in the Allis-Chalmers HD-20 Tractor, brings you productivity, handling ease and dependability that makes every hour, every day of the season count . . . gives the operator the equivalent of hundreds of gear ratios in two speed ranges . . . automatically selects the proper speed for maximum production.

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Pulling — There's nothing like the HD-20 for sheer productive power. Torque converter actually multiplies torque up to four and one-half times . . . develops tremendous drawbar pull to start the load smoothly, and automatically accelerates to highest speed conditions permit, in either high or low range.

Excavating — With full horsepower available even at creeping speed, and shifting virtually eliminated, the operator can concentrate on his front-end shovel completely . . . crowd surely and steadily . . . start and stop with a touch of the throttle.

Pushing — The HD-20 makes smoother contact, automatically matches speed to pushed equipment, maintains steady contact while loading, sends load off to the fill in a higher speed.

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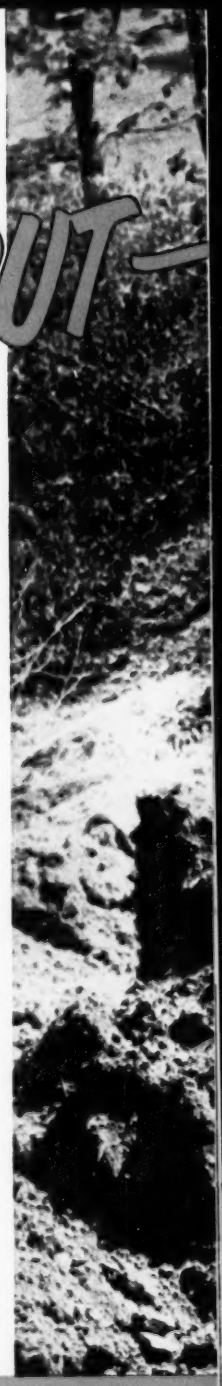

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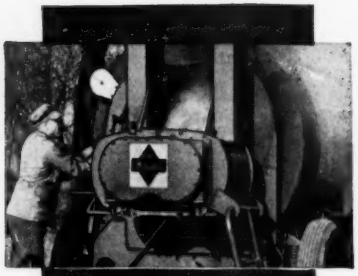

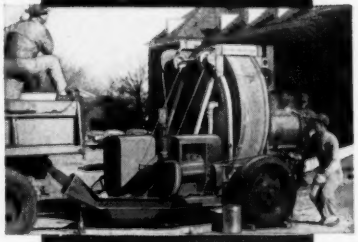

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MIXES ALL THE HOT PATCH YOU NEED, ANY TIME, ANYWHERE, ANY WEATHER

Now, the new Barber-Greene Mixall gives you the opportunity to offer high quality bituminous paving for driveways, sidewalks, service stations, industrial plants, parking lots . . . and other "black top" jobs at new low costs.

The Mixall, a completely new, compact and portable small-job maintenance and paving mixer, will produce up to 5 t.p.h. of any type hot mix . . . up to 10 t.p.h. of cold mix . . . will produce low slump Portland cement mixes. Built to be towed behind the aggregate truck for on-the-spot mixing, the Mixall is just as well suited for central plant or stock pile operation. The Mixall can work in any weather . . . even drying frozen aggregates.

Think of what you could do with the new B-G Mixall in your territory. Then see the Mixall at your first opportunity . . . or write for full information.

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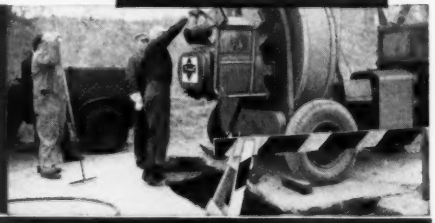

Barber-Greene

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Aurora, Illinois, U. S. A.

Sidelights for Contractors

By John C. Hayes, *Counsel*

Taxes

Bureau Procedure.—The Bureau of Internal Revenue has announced its procedure for holding informal tax conferences with taxpayers following examination by revenue agents of income, profits, estate, gift, excise, or employment tax returns. The agent will discuss his findings with the taxpayer, and if the latter is not in agreement with such findings, he will be accorded an informal conference before qualified representatives of the bureau. The taxpayer may be represented by attorneys or agents at the conference. This procedure will become applicable as the bureau's reorganization plan is put into effect in each district.

Accrual of Income.—Where a corporation on the accrual basis of accounting fully performed a government contract and received payment therefor in 1945, the Court of Claims held that the corporation had properly accrued the receipt in that year and could not recover on a refund claim later filed on the theory that the final contract price was not fixed until the completion of renegotiation in 1946. The payment which had accrued in 1945 was subject to adjustment by a proper credit in the 1946 renegotiation, but that did not postpone the taxation of the net income until the later year.

Allocation of Income.—A District Court has upheld an individual taxpayer in reporting as his own income the earnings from a business during the last half of a year, following the effective transfer of the business to him at the end of the first half of the year from a corporation in which he was the sole stockholder. The court concluded that the transfer was a legitimate business arrangement, although motivated by a desire to reduce tax liability.

Collections on Notes.—Under a decision by a Circuit Court of Appeals, liquidation of a corporation under Section 112(b)(7) of the Code is a closed transaction. Subsequent collections on loans, mortgages, and other claims which had been received by a former shareholder in return for his stock, are ordinary income rather than capital gain when made without a sale or exchange of the items involved.

Tax Lien.—A bank in which a delinquent taxpayer maintains a savings account cannot refuse to comply with a notice of levy and warrant of distraint for so much of the account as is required to pay the tax, although banking rules require the presentation of the pass book before payment can be made to anyone other than the depositor. In so ruling, a Circuit Court of Appeals distinguished an earlier decision in which the government was not permitted to reach the cash surrender value of a life insurance policy, since an election by the insured was necessary before the cash value was available and the government could not make the election.

Timeliness of Filing.—A Circuit Court of Appeals concluded that a taxpayer's petition to the Tax Court had been timely filed when properly mailed to reach the court well within the required 90-day period from date of the Commissioner's notice of disallowance, although the Tax Court's receipt stamp indicated the petition had been delivered to it one day late. The Court of Appeals thought the delay was attributable to government employes either in the Post Office Department or the Tax Court, for which the taxpayer should not be penalized by being deprived of its day in court.

Termination Pay.—Where an employer paid the balance of one year's termination pay to a former employee's widow, in accord with its agreement in the event the employee should die within the year, the Tax Court held that such payment was includible in the employee's gross estate for estate tax valuation purposes. The court also included the payment in the widow's gross income, for income tax purposes, contrary to her contention that it was received by her as a gift.

Back Pay.—The Internal Revenue Code, Section 107(d), provides, if the amount of back pay received or accrued by an individual exceeds 15% of his gross income for the year, that the income tax upon such pay shall not exceed the aggregate of the tax resulting from the inclusion of the respective portions in the years to which the pay is attributable. However, the Tax Court points out that the definition of "back pay" is strictly limited in Section 107(d). The court ruled that this section did not apply to an amount received by an employee for alleged past due commissions under a settlement reached before the beginning of court proceedings.

Public Contracts

Renegotiation.—The Renegotiation Board has amended its regulations to provide that civil contracts of the Corps of Engineers are no longer exempted from renegotiation if they relate to the construction of hydroelectric facilities or to materials required for such construction.

Assignment of Claims.—The Court of Claims decided that the government may set off its claim for unpaid and misappropriated taxes withheld by a contractor from wages paid to employees performing the contract, against a claim presented by the contractor's assignee for contract payments, since its tax claim did not arise independently of the assigned contract within the meaning of the Assignment of Claims Act.

In a second case, the Court of Claims held that a provision in a Navy contract, that contract payments to the contractor's assignee shall not be subject to set-off of the contractor's debts arising independently of the contract, did not prohibit the government from setting-off against the assignee a renegotiation claim arising under another contract and for which the assignee was liable as successor in interest to the contractor rather than as assignee.

Negotiated Contracts.—The Office of Defense Mobilization has announced that true depreciation, as well as any extraordinary obsolescence reasonably assignable to the emergency period, is allowable as a cost in negotiated contract pricing; but that accelerated amortization in excess of true depreciation is not allowable, although such excess is included in tax amortization certificates.

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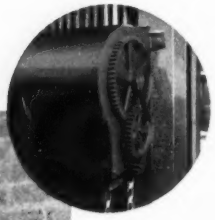
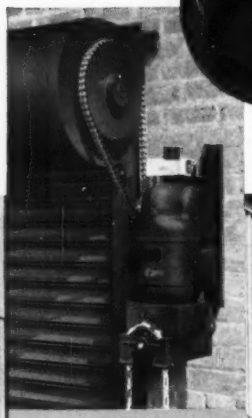
Manually, Mechanically, or Power Operated



MAHON CHAIN-GEAR OPERATOR



MAHON STANDARD POWER OPERATOR 920-P

Illustrated below you see six Mahon Power Operated Rolling Steel Doors installed in the openings of a combination truck and rail shipping dock. The power operators are located inside with through-the-wall drives. A continuous hood over the roller shafts and operating mechanisms extends the entire length of the six truck openings. This is another typical installation where no other type of door would serve the purpose—because, the vertical roll-up action of a Rolling Steel Door eliminates overhead obstructions—occupies no usable space inside or outside the opening. All-metal construction provides permanence, greater security, and assures you a lifetime of trouble-free service. When you select Rolling Steel Doors, it will pay you to compare both specifications and price tags . . . you will find that the hot-dipped galvanized curtain slat material that goes into Mahon Rolling Steel Doors is chemically cleaned, phosphated and treated with a chromic acid solution to provide paint bond, and that the protective coating of synthetic enamel is baked on at 350° F. prior to roll-forming. This is just one of the extra value features of Mahon Rolling Steel Doors. See Sweet's Files for complete information including Specifications, or write for Catalog G-53.

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ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Six Mahon Power Operated Rolling Steel Doors 18'-7" x 14'-0" installed in a new building built by the Austin Company for the Albion Malleable Iron Works, Albion, Michigan. Another Mahon Power Operated Door 17'-0" x 22'-0" is installed in a railroad opening in the end of this enclosed loading dock.

MAHON

Hazards of Defense Construction

THE HAZARDS to which general contractors submit their reputations when they undertake, even reluctantly, certain kinds of defense construction contracts are illustrated by the interim report last month of the Preparedness Investigating Subcommittee of the Senate Armed Services Committee. (Page 25)

This report received nation-wide publicity in its criticism of the construction of the Moroccan air bases. Although the report was far more critical of government agencies than the contractor, the reputations of the partners to the joint venture, and the entire construction industry, were damaged.

The contractors demonstrated to the committee when they were permitted to appear at public hearings that they had carried out their work in conformity with the instructions from the Army District Engineer in charge, as required by their contract. The committee stated that it did appear that especially in the early stages the contractors were confronted with many difficulties, but that because their investigations were not complete they did not want to prejudge the matter of the contractor discharging his responsibility.

The committee, in its report, quoted from the testimony of the contractors' spokesman who outlined their position:

"Orderly, economical planning and operation, which is the normal approach to a construction job, is not possible under conditions such as those surrounding the initial phases of the Moroccan work, where plans and specifications are nonexistent; when equipment must be procured wherever obtainable to meet unknown conditions; where quantities of work are not known; where wage rates are established by others months after work is started; where transportation of personnel and shipment of all materials, equipment and supplies are controlled by a separate agency of the government; where ships arrive in a foreign port and insufficient personnel is there to unload, tally, guard and protect the shipments; where work is done in a country using two foreign languages; where housing is extremely scarce, but no place is made available to build camps; where a central office cannot be constructed for a year, causing use of 10 separate locations to obtain office space; where a separate foreign governmental agency must approve all actions; where communications are very poor; where funds are turned on and off like a faucet; where recruitment and procurement have been started and stopped many times; where camps are built only to be torn down, moved to a new location, torn down and moved again, back to the original location; where construction work is to be started only to be stopped, the location abandoned; where personnel is recruited, processed and shipped to the point of embarkation and then returned to their homes, discharged, because sufficient funds were not allocated in time; and where skilled and specialized personnel were recruited and sent to the job site to do specific work, only to be utilized in less highly skilled work, or returned home, because the work for which they were hired has been taken over by the protectorate government, and their services are no longer required for the work."

Much of the committee report was critical of the lack of coordination between the various government agencies who had varying responsibilities for the project.

The partners to the joint venture constructing the Moroccan bases are all general contractors of excellent reputation. Neither they nor any other reputable contractors enjoy being involved in projects for which they receive such criticism.

The responsible contractors of the nation clearly recognize that their own future and that of the construction industry rests, in part, on the construction of public projects with scrupulous honesty and the maximum of efficiency and economy so that the public has confidence in the industry and the integrity of its members.

Members of Congress, government agencies, general contractors and the public all have a clear-cut interest in the construction of essential defense projects with all possible efficiency and economy.

The responsible contractors of the country offer, through The Associated General Contractors of America, as they have done before, their fullest cooperation to government agencies and to Congress in bringing about the conditions under which defense construction can be undertaken most effectively and under which justifiable credit will be brought both to the government and the industry.

Pessimism and Controls

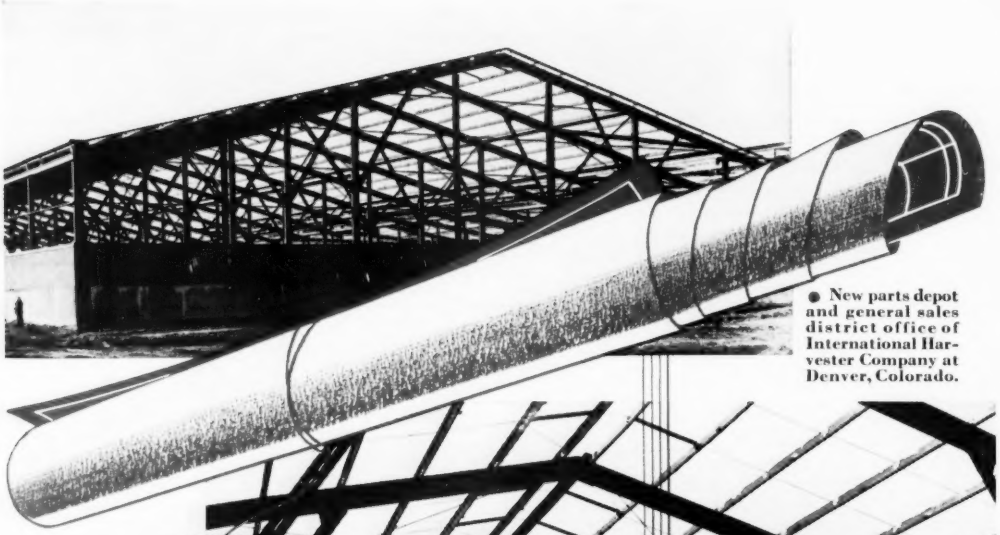
GOVERNMENT OFFICIALS administering the mobilization controls have again brought forth a pessimistic appraisal with their announcement that construction regulations can not be relaxed until after the first quarter of 1953.

These are essentially the same relaxations that earlier had been planned to go in effect in the third and fourth quarters of this year, but were postponed with the occurrence of the steel strike. The postponement, therefore, is one of nine months for some of the proposed relaxations and six months for others—a lengthy period that seems hard to justify on the basis of only two months' loss of steel production.

There has been a notable pattern of gloomy forecasts followed by sudden reversals which sometimes have the effect of surprise. This has happened in the case of steel early in the mobilization program when people were almost led to believe there would never be enough to go around, and most recently in the cases of copper and aluminum. Whether it is just another example of how American industrial ingenuity outstrips all predictions, or a matter of pessimism as a necessary ingredient of controls for a calculated effect, is not readily apparent.

Press reports of DPA Administrator Fowler's concession that he had been "overly pessimistic" about steel's ability to get back in high gear, and that both civilian and military steel-using plants will have adequate "minimum steel inventories" by around the first of the year, is certainly an encouraging note (page 21).

Perhaps another silver lining in the cloud of construction controls will become apparent by that time.



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Send plans and specifications to Allied to be estimated!

In the three Allied shops, located at strategic points, skilled men and abundant plant equipment are available to fabricate the steel in record time.

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Fabricators and erectors of structural steel for highway and railroad bridges; Industrial, office, school, and government buildings; Airport structures; Harbor facilities.

Easing of Construction Controls Tentatively Set for April 1, 1953

- But Industry Advisors Seek Earlier Relaxation
- Belief Persists That Recovery Possible by Jan. 1

» MAJOR RELAXATIONS of construction controls which had been planned to go in effect during the latter half of 1952, but postponed because of the steel strike, will become effective April 1, 1953, the National Production Authority announced last month.

NPA's plans were announced to its Construction Industry Advisory Committee during an August 26 meeting. However, the agency agreed to consider at another meeting of the task group on October 29 the possibility of easing the controls earlier "in the light of the materials supply situation at that time."

It was understood that government officials at the operation end of controls with a realistic picture of industry conditions had favored relaxing the regulations sooner than April 1, but were overruled by the policy-making Defense Production Administration.

Quick Steel Comeback

Industry observers have felt that the steel industry would recover quickly in production to justify relaxation of construction curbs by January 1. This expectation was strengthened by the Federal Reserve Board's report that steel production in the last week of August was 99% of capacity, and that industrial production in general during the month was back to prestrike levels.

Furthermore, the loss of two months' production was questioned by industry observers as justification for postponement of control relaxations by six to nine months.

The advisory committee recommended that NPA:

Advance the effective date of the liberalizations if possible.

Suggest to the Federal Reserve Board that credit regulations be relaxed on commercial and industrial construction. (The agency said it would "communicate the committee's recommendation to the Board.")

The relaxations now scheduled for April 1 are largely the same as those previously slated (June CONSTRUCTOR, page 21) to become effective either on July 1 or Oct. 1, 1952, permitting recreational construction and an increase in amounts of controlled materials that can be self-authorized for most types of construction. However, the April 1 liberalizations will ease controls on multi-unit apartment construction as had been recommended by the advisory committee, and also will permit greatly increased allotments of aluminum and copper in several categories.

April Relaxations Scheduled

The April 1 rules which NPA is issuing now "so that builders can do the preliminary planning for future construction and place advance orders with suppliers," will permit self-authorizations as follows:

Recreational. For recreational, entertainment and amusement construction, per project per quarter: 5 tons of carbon steel including 2 tons of structural shapes, 500 pounds of copper and copper-base alloys, and 300 pounds of aluminum. No self-authorization is permitted now for these types of projects.

Schools. For elementary and secondary schools, per project: 50 tons of steel, including not more than 7 structural, 5,000 pounds of copper and 4,000 pounds of aluminum. Current limits are 5 tons of steel, 1,000 pounds of copper and 2,000 pounds of aluminum per project per quarter.

Highways. Per project: 25 tons of steel, including not more than 12 tons of structural, 500 pounds of copper and 500 pounds of aluminum. Highway projects now may use only 2 tons of structural steel.

Residential. For one- to four-family houses, per unit: 1,500 pounds of structural steel in addition to materials now permitted. Currently, 275 pounds of aluminum, 200 pounds of copper and 2,300 pounds of carbon steel are permitted for homes with steel pipe water distributions; and those with copper pipe systems can use 275 pounds of aluminum, 400 pounds of copper, and 1,950 pounds of steel. The extra copper allowance for forced hot water heating and radiant heating will continue unchanged.

For multi-unit walk-up projects, per dwelling unit: 2 tons of steel, including up to 500 pounds of structural, 200 pounds of copper and 275 pounds of aluminum. No self-authorization now is permitted for these.

Multi-unit elevator-type projects, per unit: 3 tons of steel, including up to 600 pounds of structural, 225 pounds of copper, and 275 pounds of aluminum. This also would be the first self-authorization given.

All other construction. NPA is changing its definitions, with "all other construction" to include industrial, commercial, public, hospital, university, public utility, water and sewage, and transportation facility projects. These types on April 1 would get per project, per quarter: 25 tons of steel, including all types of structural shapes but no stainless steel and not more than 2½ tons of alloy steel; 5,000 pounds of copper and 4,000 pounds of aluminum.

At present, all these types except industrial are permitted to self-authorize 5 tons of carbon steel including not more than 2 tons of structural but no wide-flange beams or sections, 1,000 pounds of copper, and 2,000 pounds of aluminum.

Under the April 1 rules, one ton of stainless steel per project, per quarter may be self-authorized for chemical plant construction.

Equipment. NPA plans to raise the dollar limit on DO rating authority

At a press conference August 29, DPA Administrator Henry H. Fowler conceded that he had been "overly pessimistic" about the difficulties involved in getting production back on schedule after the steel strike. He commented on the "quick comeback" of production and added that he now hopes the military and atomic energy programs will have their full 1952 steel tonnage, predicting that both civilian and military steel-using plants will have adequate minimum steel inventories around the first of 1953. He said there "probably" will be enough materials to end most civilian production controls next year, or to speed up the military program. In the event of the latter, he said, further diversion of supplies from the civilian economy would not be necessary for a speedup.

for purchase of non-controlled building equipment and production machinery.

For recreational construction, new limits would be $15,000 for building equipment and $5,000 for production machinery; for "all other" types, $100,000 for building equipment and $200,000 for production machinery; and for residential, no limit.

Present limits are $100,000 for building equipment and $200,000 for production machinery for industrial construction, and $15,000 and $5,000 respectively for "all other" construction. No limit is placed on residential.

Purchase orders. Direction 8 to CMP Regulation 6, which will list the above relaxations to become effective April 1, also is expected to permit placement of purchase orders for the new self-certification quantities at any time, provided that they do not call for delivery before April 1, 1953.

Other Actions Taken

Other changes in regulations which NPA proposed to make immediately included: revocation of Order M-100 on housing and incorporation of its provisions into CMP Reg. 6, and permission for an owner to use inventory he had on hand prior to Oct. 1, 1951; a change in CMP Reg. 6 providing that applications for recreation facilities connected with hospital or school projects be filed with the Federal Security Agency or, in appropriate cases, with the Veterans' Administration; and permission to use a DO rating to purchase operating equipment for schools and hospitals as well as industrial plants.

Members of The Associated General Contractors of America who attended the August 26 meeting of the advisory committee were A.G.C. President Arthur S. Horner, A. S. Horner Construction Co., Denver; and Director H. C. Turner, Jr., Turner Construction Co., New York City.

Aluminum, Copper Ease

Earlier, DPA announced that copper and aluminum are "in approximate balance with defense and essential civilian demand" to the extent that most prohibited uses now will be permitted and allotments will be increased, with full allotments expected by the second quarter of 1953.

The agency said this is possible despite a loss of as much as 110 million pounds due to delay of aluminum facilities during the steel strike.

Navy Praises Bid Changes Urged by A.G.C.

• Bureau Announces Benefits of Improved Bidding Procedure

» RECENT MODIFICATIONS in the Navy's contract bidding procedure, recommended by The Associated General Contractors of America, have brought better results than anticipated, according to Rear Admiral J. F. Jelley, CEC, USN, Chief of the Bureau of Yards and Docks.

Low Bidder Lost Out

Before the change was made, cases occurred where Public Works Officers asked for bids on a project on the basis of a minimum facility plus a large number of alternate items. In accepting bids based on the alternates most desired, the low man on the basic bid sometimes lost out.

To correct this practice A.G.C.'s Task Unit for Bureau of Yards and Docks Specifications submitted a request that the number of bid items on an invitation be reduced.

Several months ago, therefore, Public Works Officers were instructed to include in the basic bid item only such work as reasonably could be expected to be procured within the funds available, and which would provide a usable facility. A minimum number of deductive or additive items were to be used only as necessary to insure award within funds available, but in no case detract from the usable facility called for in the basic bid.

This reduction of bid items has largely eliminated difficulties previously encountered, Admiral Jelley said.

Edward P. Coblentz, McLean Contracting Co., Baltimore, is chairman of this task unit of the A.G.C. Committee on Contract Forms and Specifications.

Recommendations made by another of the association's task units are being put into effect by the Bureau of Reclamation, Department of Interior. George C. Loorz, Stolte, Inc., Oakland, Calif., is chairman of that unit.

The association's committee has other task units on Army Corps of Engineers, building, highway and municipal specifications which meet periodically to recommend improvements in specifications or bidding procedures to appropriate agencies.

Creedon Takes Defense Construction Post

• Leaves NPA to Become Defense "Director of Installations"

» FRANK R. CREEDON has left his post as assistant administrator in charge of facilities and construction for the National Production Authority to accept appointment as director of installations in the office of the Secretary of Defense.

Mr. Creedon has been a planner and administrator in public works construction for the past 10 years. In 1944 and 1945 he served as general manager in charge of construction of the atomic bomb plant at Oak Ridge, Tenn., a job for which he was awarded the Medal of Merit, highest civilian award for service to this country.

The duties of Mr. Creedon's new office include the making, from time to time, of reports to the Secretary of Defense "with respect to public works projects under construction by the military departments as he may deem necesary to keep the Secretary of Defense currently and fully informed" with respect to the status, progress, cost and all other pertinent matters concerning such projects.

Public Law 534, under which Mr. Creedon's appointment was made, provides for the establishment of the office of director of installations for the Department of Defense to maintain surveillance for the Secretary over the planning and construction by its military departments of all public works projects. Section 408 of the law states that the appointee shall be a civilian appointed by and directly responsible to the Secretary of Defense. Following World War II, during which he had charge of $4,750,000,000 worth of construction for the munitions and chemical warfare plants and synthetic rubber plants programs, Mr. Creedon served as National Housing Expediter. He joined the NPA Facilities Clearance Staff in November, 1950, and was appointed to the office he has just left one month later.

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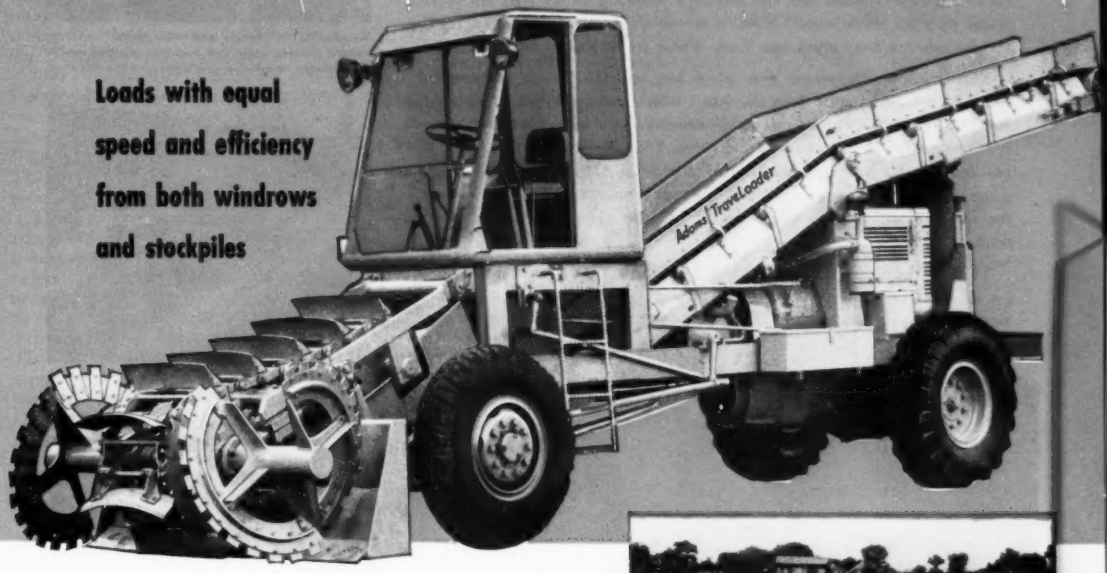

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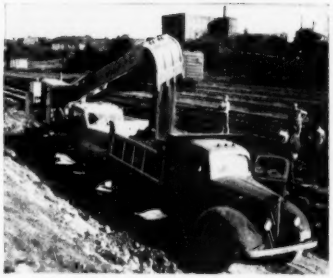
But the Gradall's unique *arm-action* and *controlled down pressure* did the job fast—and better than the hand labor and machines it replaced. Working from the top of the bank—around posts and other obstacles—it first trimmed the top part of the slope. Then, backed into the narrow passageway, its hydraulic-telescoping boom "reached out" to finish the slope's lower portion, as well as digging a drainage ditch and cleaning the roadbed right up to the ties—all from this cramped position—with no hand labor.

The multi-purpose Gradall is one machine you're sure to keep busy on all sorts of earth-moving and construction jobs. For a field demonstration of its cost-cutting efficiency, see your nearest Gradall Distributor.



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Congressional Report Highlights Overseas Construction Hazards

- Contractors Risk Reputations in "Crash Programs"
- Senators Criticize U. S. Agencies, Joint Ventures

» THE PROBLEMS of general contractors executing top-speed defense construction projects overseas, particularly when several government agencies were involved, were brought into sharp focus last month by the interim report on Moroccan air base construction by the Preparedness Investigating Subcommittee of the Senate Armed Services Committee.

This subcommittee, headed by Senator Lyndon B. Johnson, (D., Texas) was critical of the Air Force, the Army Corps of Engineers, the State Department, and Atlas Constructors. This report resulted in nation-wide publicity.

The bases are being built in North Africa for the Air Force by Atlas Constructors, a joint venture under contract to the Army Corps of Engineers. Principal negotiations for use of the sites were carried on with the French by the State Department. The subcommittee, emphasizing its report was an interim one, stated in part:

"The building of these five air bases in French Morocco represents one of the largest and most expensive construction projects in history. The difficulties which confronted our planners were great—so great that the bases could be justified only upon the most pressing strategic need.

"Merely to survey the sites required intricate negotiations with the French. These negotiations were beset with many difficulties and complicated problems. Once the site had been entered, the difficulties multiplied—difficulties with the French authorities; with procurement of materials; with scarcities of workmen, with the weather itself.

"Under the conditions, large-scale, lavish spending may have been impossible to avoid. But even had the difficulties been overcome, the so-called crash program directive—the decision to steam ahead at full speed regardless of the cost—made waste inevitable . . .

"Nevertheless, we do not believe that these considerations justified the compulsion to spend the taxpayers' money that appeared to characterize this project. We do not believe that they justified the flagrant disregard for specifications and sound engineering practices. We do not believe that they justified the indifference of officialdom to the squandering of public funds."

Public hearings on charges of waste on the project had been held by the committee from January through April. In May the contractors were given the opportunity to defend themselves in the public hearings. Atlas Constructors is a joint venture composed of Morrison-Knudsen Co., Bates & Rogers Construction Corp., Ralph E. Mills Co., Blythe Bros. Co., and Nello L. Teer Co.

Spokesmen for the contractors demonstrated at the hearings that all their work was undertaken in conformity with the instructions from the Army district engineer in charge, as required by the contract. (June CONSTRUCTOR, page 22.)

The subcommittee, in its interim report, stated in part:

"Representatives of the contractors have denied responsibility for the failures that have occurred and state that whatever they did contrary to standard construction practices was at the direction of the district engineers. Our investigation of that phase of the matter is not complete.

"It does appear that especially in the early stages of the job the contractors were confronted with a series of difficult and somewhat frustrating situations . . . The committee does not feel that it has sufficient evidence at this time intelligently to comment on the contractors' responsibility and does not wish to prejudge the matter."

Joint Ventures Criticized

In its conclusions and recommendations the committee stated:

"The Secretaries of the Army, the Air Force and the Navy, in liaison with the Secretary of Defense, should carefully consider whether the so-called 'joint venture' is a proper organization for the performance of military construction, and whether in dealing with this hybrid type of organization the interests of the government can be fully protected. . . .

"Atlas is a good case in point. It is not a corporation, and at best is a partnership in name only. It is a loose and legally vague arrangement. The determination of legal responsibility under these conditions is difficult. Perhaps, the proper approach in a situation of this kind would be to designate one of the five companies as the prime contractor and the others as subcontractors. In this way a clear and definite primary responsibility would be established. There may be valid arguments in favor of the joint venture form of organization in projects of this size, but in our view they lose significance when weighed against the lack of firm leadership and centralized responsibility inherent in this type of hybrid set-up."

More Voice for Air Force

The committee also stated:

"The committee cannot understand how the confusion regarding the duration of the 'crash program' could have occurred. This was a project involving at least $300 million of the taxpayers' money, and yet we find that there was no clear understanding by the various parties involved, principally the Air Force, the Corps of Engineers, and the contractor, as to the basis on which they were proceeding. This is a clear example of lack of proper coordination and administration and should never happen again . . .

"The committee concludes also that the mechanics by which the Air Force is kept advised of the progress of such construction work and the use of money appropriated for it should be improved. At present it is evident that the Air Force has little or nothing to say as to how the funds which it is requested to justify before Congress for this type of construction are spent. This is not to say that the Air Force should set up its own construction force. That would be wasteful and duplicitous. It is to say, however, that the Air Force should have better liaison with the Corps of Engineers during the progress of such construction.

"The committee is also of the opinion that current auditing procedures relating to defense contracts, and cost-plus-fixed-fee contracts in particular, should be reviewed and strengthened."

Indications of Tightening Money Market

- RFC Raises Interest Rates on Public Construction Loans

» AT A TIME when the Federal Reserve Board has lessened the availability of bank credit, the Reconstruction Finance Corp. has increased the interest rate on construction loans for public agencies.

Formerly 4%, the rates were increased to 4¼% Aug. 15. This tightening up of the money market was described as a "normal adjustment" by the government in view of higher construction interest rates charged by banks and such lending agencies.

Such loans are made by the purchase of bonds issued by states, counties, cities or other public bodies for the construction of water and sewer systems, hospitals, bridges, tunnels, municipal transit facilities and other similar projects.

But now such loans are harder to get since the Reserve Board recently effected its new policy requiring member banks to secure additional reserves chiefly by borrowing from the central bank. Formerly, member banks found it easy to secure additional reserves simply by selling government securities to Reserve banks.

In order to get reserves now, member banks have to borrow more from the Federal Reserve banks. Results are that interest rates are firmer but bank credit less available.

More evidence of the tightening money market was seen last month when the Treasury sold its weekly offering of short term bills at an average of 1.903%. This is the highest cost for such government borrowing since the banks were closed in 1933.

The result of this tighter credit will probably be that public agencies, unable to get aid from private lenders, will have to turn to the RFC. To qualify for such loans, a public agency must first be unable to get funds from private sources, which usually charge higher interest.

Though the RFC rates have been increased, the agency does not think that local government groups will suffer hardships as a result.

The agency pointed out that the interest rate on such loans was not changed when the business loan rate was raised from 4% to 5% in 1950 or when "disaster loan" rates were adjusted last June. Disaster loan interest rate on homes occupied by the borrower of RFC funds is 3% and 5% for homes rented for profit.

As for commercial construction, the Reserve Board reported that the tighter conditions will have little adverse effect on sound, well-placed loans, but will choke off the "wildcat or marginal" loans. As long as a borrower is a safe risk, one official said, banks and insurance companies will lend the money.

"U. S. Might Have Gone in Steel Business"

» ACCELERATED amortization granted the steel industry for $2.3 billion worth of new facilities may have staved off government construction and operation of steel mills, an editorial in *Steelways* asserts.

The magazine, which is the official publication of the American Iron and Steel Institute, credited the government assist as the better way of expanding production. Investors, skeptical of the peacetime need for so much extra production capacity, were reluctant to gamble that the 20% increase would pay off in profits when the war emergency eased off.

"But we needed steel and we needed it badly," *Steelways* said. "Since the investor hesitated to provide the money, the government might simply have built mills for itself and gone into the steel business."

In Washington, D. C., recently, the Defense Production Administration confirmed reports that the government still is considering asking Congressional authority to build its own war plants. DPA chief, Henry Fowler, mentioned several heavy steel products specifically, such as armor plate, heavy castings and forgings, that might be government-produced.

Congress refused such authority to DPA when the Defense Production Act was first drafted but favored the fast tax-amortization incentive to encourage private steel companies to expand. An alternate possibility is to build government facilities next to private plants and let the industry operate them.

Mr. Fowler claimed that, in some cases, private industry has urged that the U. S. build the needed facilities.

Housing Curbs to Be Eased

The annual rate of new housing starts this year, expected to be less than 1.2 million, making the relaxation of Regulation X mandatory, is still not far behind the number of new starts for last year.

At the end of July, the number stood at 669,000 as compared with 680,000 for the same period of last year. If the present rate keeps up there will be close to 1.1 million new starts by the end of the year.

This will still be a "good year" for home building. In one respect, it will be particularly good for moderately priced homes, those under $20,000. The Home Loan Buying Board, which records the rate of mortgage loans, reported mortgages for homes in this bracket sold at the rate of $16 billion in 1950, $16.3 billion in 1951 and are selling at the rate of more than $17 billion this year.

According to the amended Defense Production Act, if the annual rate of new housing starts is less than 1.2 million for three consecutive months, the Reserve Board and the Housing and Home Finance Agency cannot require down payments of more than 5% of the price of the house. Current down payments range from 5% for houses of $7,000 or less and up to 40% for houses costing $25,000 or more.

The two government agencies are using new-start figures for June, July and August to determine the annual rate. For June the average stood at 1.06 million, in July it stood at 1.08 million and it was believed unlikely that housing starts would hit the 1.2 million rate necessary to keep Regulation X in force past Oct. 1.

Commercial Credit

In fact, only once have American home builders put up more than 1.2 million homes. That was in 1950 when 1.39 million starts were made.

The Reserve Board through August made no official statement on whether it will relax or remove down-payment and mortgage controls on such nonresidential construction as stores, office buildings and warehouses, but one spokesman hinted that it would be hard to keep such controls if housing credit curbs are discarded.

The NPA Construction Industry Advisory Committee has asked NPA to seek relaxation of commercial credit curbs (see page 21).

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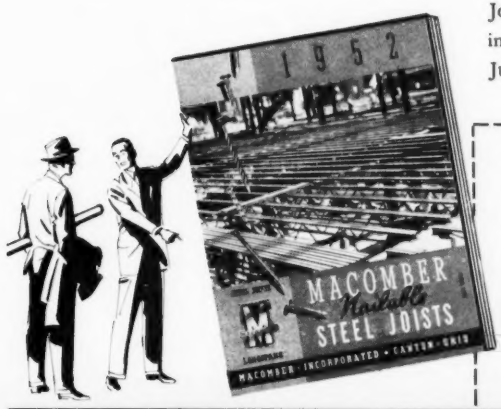

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FRB Paints Bright Construction Outlook

• "Continued Strength in Markets Related to Real Estate"

» A BRIGHT PICTURE of continued strength in the construction and building materials industries and the real estate business was painted last month by the Federal Reserve Board.

Salient points in the board's report on real estate were:

• Physical volume of new construction remains at a record level with output of building materials and employment in construction large.

• Construction costs, materials prices, and real estate values "have been generally stable at or close to record levels," and construction wage rates have risen further.

The Departments of Commerce and Labor have delayed announcing estimates of August construction volume (cover graph and Constructographs on pages 9 and 11) pending receipt of more information on effects of the steel strike.

• "Contract awards, plans of business and government for construction, and consumers' buying intentions, all of which will influence activities in the coming months, suggest that most markets related to real estate will continue strong."

• Markets for both old and new business and residential properties are "generally strong," extension of home mortgage credit continues in large volume, and outstanding mortgage debt, which is already almost three times as large as at the end of the war, is still rising.

• The reduction in steel, uncertainty of future requirements of Regulation X, the pending expiration of rent controls, and stimulation of defense housing activity will affect future construction activity.

• Controls have resulted in shifts in types of construction, with increases in public and continued large business volume offsetting declines in other types.

• There has been an increase in purchases of old houses accompanying the decline in completion and purchase of new houses, resulting in an offset of the reduction in credit extended on new residential property.

Materials Production and Prices

Output of most building materials was "exceptionally large" in 1950 and early 1951, resulting in a heavy accumulation of stocks last year and a consequent decline in output.

Lumber stocks at mills and yards reached a postwar high early this year and have changed little. Cement stocks also increased considerably, reaching a peak last spring.

Manufacturers' stocks of fabricated metal products, reflecting anticipation of metals shortages and a smaller-than-expected demand, soared from the low levels of late 1950.

Production of lumber, some lumber products, and millwork have either shown little more than seasonal change or have declined. Cement production, however, has continued at a record level.

Building materials' prices "have been generally stable for about a year close to record levels." Major changes this year have been in lumber and lumber products, plumbing equipment and asphalt roofing.

"Prices charged by building materials dealers have varied among the cities for which such information is available, but for most materials have changed little this year."

Employment and Wages

Contract construction employment has been maintained at about 2.5 million workers, slightly smaller than the record number employed in the summer and fall of 1951. All types of labor are reported available throughout the country in contrast to spot shortages of bricklayers and plasterers reported a year ago.

"Perhaps reflecting in part this ready availability of workers, employers have been less willing than formerly to meet demands for increased wages and other benefits, and strikes have been more frequent this spring and summer than in other recent years. In general, however, work stoppages have not been long and costs have not been greatly affected.

"During the first half of 1952 union wage rates in the building trades increased 3%, about the same as in the first half of 1950 and 1951 . . . Average hourly earnings in contract construction were relatively stable throughout the first 5 months of this year at about $2.25, some 6% higher than a year earlier."

Volume of work was a record for the first 7 months with increases in public types offsetting small declines in private. Expenditures were at a seasonally adjusted annual rate of $33 billion, 5% higher than last year, mainly representing the rise in costs.

In public volume, military construction has risen sharply from $10 million a month before Korea to about $150 million in recent months, and this high level is expected to continue for some time. Outlays for atomic energy plants have increased.

Highway work has increased about 14%, but a number of school, hospital, and other public buildings have been deferred because of restrictions.

Building Need Great

"The need for such buildings is very great, and public construction may continue in large volume or increase when defense restrictions are relaxed."

Private business construction expenditures have changed little since last summer, but outlays by public utility companies have continued to increase, reflecting further expansion in electric power, gas, and telephone facilities.

Little change is shown in industrial construction, with much of the private expansion for defense completed.

Little change is shown in outlays for commercial structures since the substantial decline noted in 1951 in construction of stores and other retail facilities due to controls.

Multi-family housing decreased sharply in 1951 following expiration of Federal Housing Administration authority to insure mortgages under section 608 of the National Housing Act, and continued at a low level the first half of this year. An increasing number of rental units has been started in recent months under FHA defense, military, and cooperative housing programs.

New housing unit starts in the first half of 1952 totaled 566,000, compared with 590,000 in the corresponding period of 1951 and a record 706,000 in the first half of 1950. Privately financed housing starts have been averaging around 100,000 or more a month recently.

Units started under arrangements for FHA-insured or VA-guaranteed financing have constituted a smaller proportion of total private starts this year than in other postwar years, about 36% compared with 45% in the first half of 1950 and 1951.

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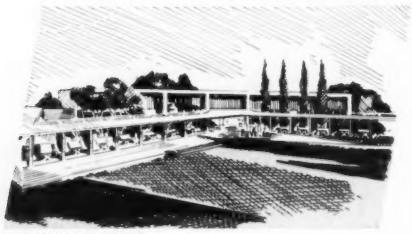
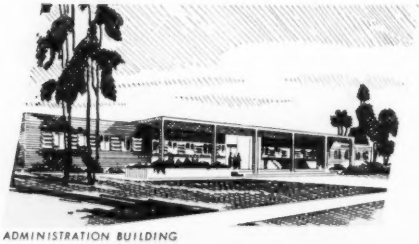


SUBSISTENCE BUILDING



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Heavy Construction Notes

• A bond issue totaling $90 million to $100 million will be offered this fall by the newly formed Delaware River Port Authority to finance a second bridge between Philadelphia and Camden. The governors of both Pennsylvania and New Jersey have authorized the project which will be financed by revenue bonds. The six-lane span is expected to be completed in about three and a half years.

• Deepening of the Chesapeake and Delaware Canal, which runs 19 mi. from the Delaware River to the Chesapeake Bay, is being considered by the Army Board of Engineers for Rivers and Harbors. Besides cutting a channel 35 ft. deep and 450 ft. wide, the Corps of Engineers would build a new railway bridge, replace two highway bridges and provide an anchorage basin in Elk River, Md., in conjunction. Federal cost of the project is estimated at $87 million.

• Construction of the $85-million third tube of the Lincoln Tunnel, connecting New Jersey and Manhattan, is expected to begin this month, after the first contract is let for digging the land ventilation shaft and the first land section of the tube.

The shaft will be 85 ft. deep, 130 ft. long and 60 ft. wide. The two-lane tube will supplement the present four lanes of the Lincoln Tunnel which now carry over 18 million vehicles a year under the Hudson River.

A great deal of controversy has surrounded the proposal. Some officials felt that the $21-million plan for Manhattan street connections was inadequate and the tunnel would contribute to the borough's already crowded streets. Accord was reached when the Port of New York Authority agreed to spend another $5 million for further improvements.

Atomic Energy Commission in High Gear

• Kiewit Gets $1.2 Billion Contract as Program Hits Peak

» ATOMIC ENERGY plant construction is expected to hit its peak this month with a volume of about $128 million—almost 5% of the nation's total monthly new construction.

Long-range plans of the Atomic Energy Commission are materializing under a building program set apace by contract awards of record-breaking amounts. Second largest construction contract ever drawn was let last month for a $1.2 billion atomic energy plant in Pike County, Ohio.

Peter Kiewit Sons' Co., A.G.C., Omaha, was named principal contractor on the tremendous installation, a gaseous diffusion plant for the production of Uranium 235, the vital factor in atom bombs. Construction of the complete facility will take about four years. A peak of 30,000 workers may be reached on the job, with average employment reaching 17,000.

The immense plant will cover 6,500 acres and necessitate development of new power sources for full operation. To supply the lack, a 15-company utility group will build two generating plants which will produce 2.2 million kilowatt hours of energy. One will cost $280 million, the other, $120 million.

AEC will not undertake construction of housing units for personnel. Competitive bid and fixed-price contracts will be used to the fullest extent practicable, the agency says.

The $1.2 billion Kiewit contract includes design and equipment cost of the Pike County plant, as well as construction cost. At another atomic energy installation still under way—the Savannah River plant—design, construction, equipment and operation will cost $1.4 billion.

Two other sizeable contracts were awarded late in July for additions to existing AEC plants. A $464-million expansion at Oak Ridge will be built by the Maxon Construction Co., A.G.C., Dayton, Ohio. At Paducah, the prime contract on a $459-million addition has been awarded to F. H. McGraw and Co. of Hartford, Conn.

Tight construction schedules and the urgency for increasing production were important factors in selecting Maxon and McGraw, both of whom have experience in building gaseous diffusion facilities, the agency said. A substantial part of the work at both sites will be done under fixed-price subcontracts, AEC reports.

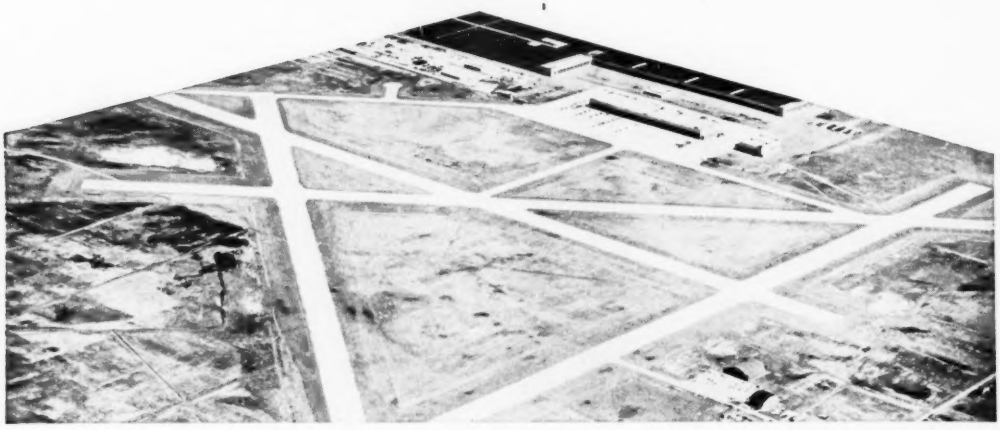
Another large contract, for about $100 million, went to Kaiser Engineers, A.G.C., New Orleans, for construction of a large part of the $400-million expansion authorized on the Hanford, Wash., plutonium project. The contractor has not yet been announced for a $33-million job at AEC's National Reactor Testing Station in Idaho. Preliminary design studies have been completed by Parsons-Macco-Kiewit Co. of Los Angeles.

Peter Kiewit, winner of the $1.2 billion award, has since been featured in several national magazines. The contractor's Horatio Alger rise in the construction industry has been marked by hard work and an aptness to expand when others feared the future.

One of the most modern hydraulic pipeline dredges afloat, built by Ellicott Machine Corp. of Baltimore, is pictured at left. The 3,500 h.p. machine has a rated output of 650 cu. yds. per hour at a maximum depth of 39.4 ft. Equipped for 24-hour operation, the 160-ft. craft has living quarters for 32 men.

The Ellicott firm built the huge dredge as one of nine for the Republic of Indonesia.

8 winters . . . impact of countless high-speed landings prove DURAPLASTIC'S durability



O'Hare Field, Park Ridge, Ill. Designed and supervised by U. S. Engineers and the Austin Company. Contractors: Standard Paving Co., White Consolidated Inc., and Thos. McQueen Co.

● For eight years, airplane tires have smacked against the Duraplastic-paved runways at O'Hare Field in Chicago. And during 8 winters, innumerable freezing-thawing cycles have severely tested the surfaces. Typically, against time, traffic and weather, the concrete made exclusively with Duraplastic* has remained durable and highly scale-resistant. Here's why:

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Above, equipment in a steady, circling line pushes dirt into fill for shoo-fly around tunnel on the Southern Pacific Railroad.

Below and at right are views of damage done to rail lines in the California earthquake area. Tracks were distorted and tunnels shattered. Contractors are hard at work now repairing the damage.

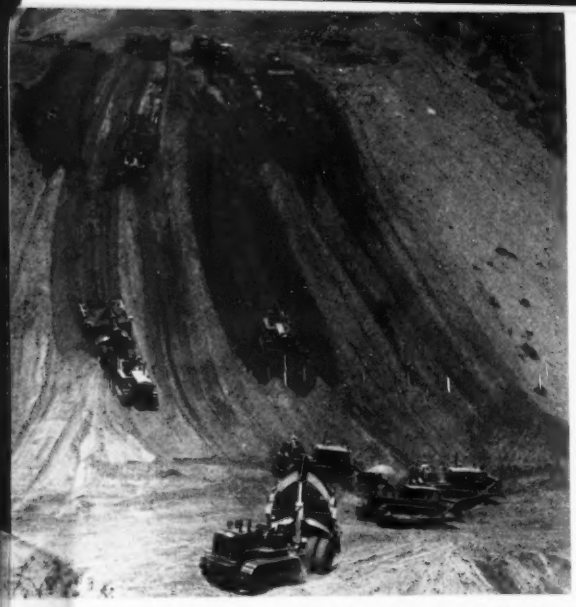
(More pictures on following page)

Contractors Clear "Earthquaked" Tunnels

» The violent earthquake that struck Bakersfield and Tehachapi, Calif., a few weeks ago disrupted rail lines and impaired tunnels in the area. The speed with which California contractors moved to repair the damage is indicated in these pictures. Morrison-Knudsen Co., A.G.C., Los Angeles, led other contractors in moving an estimated 750,000 cu. yds. of earth around four debris-clogged tunnels of the Southern Pacific Railroad.

Working two 10-hour shifts a day with 350 men, the contractors carved out a 3-mi. access road. Three of the four tunnels had to be "daylighted"—made into deep cuts. The fourth was salvaged although workers were in constant fear that one of the 200 "afterquakes" registered might bring the entire structure down on their heads. Eighty Caterpillar tractors and scrapers were put on the job.

The quake was called "worse than the 1906 quake" which set San Francisco afire and killed 700 people. Tehachapi was hardest hit.



Close-up view of dozers and scrapers pulling earth off hillside for fill on which to lay new track. Fifty Caterpillar tractors and 30 scrapers were used on the huge repair project.

The tremors started landslides which cascaded across tracks and blocked tunnel entrances like this. Bulldozer at top left corner of photo is tackling the big clearing job.

View of another vast reconstruction job on the Southern Pacific Railroad which ran through the heart of the recent earthquake area. Tons of earth were moved from around tunnels and rail lines. Morrison-Knudsen had the prime contract and enlisted the aid and equipment of all other contractors nearby. Since the quake, which left the damage seen in these photos, another upheaval has struck this section. Reports are now coming in of even more disruption, and reconstruction efforts are being intensified.

Reclamation Book Published

The fruits of reclamation are set forth in a new book designed to provide material for college courses and to review the reclamation programs in this country.

The book, *Reclamation in the United States,* was written by Alfred R. Golze, director of programs and finance, Bureau of Reclamation. Mr. Golze traces reclamation as it has made the gradual transition from simple irrigation projects in the newly-opened west of 100 years ago to the vast multi-billion-dollar irrigation, hydroelectric power, flood control and river basin developments of today.

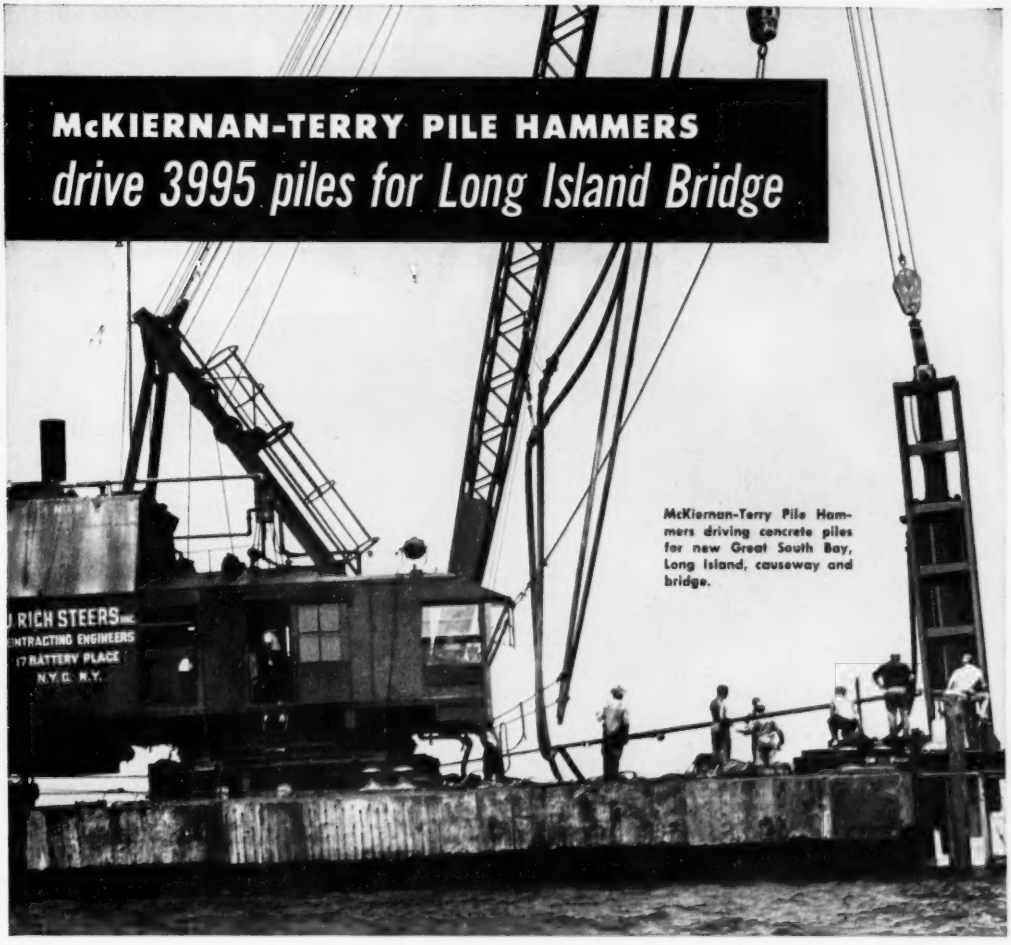
Separate chapters are devoted to the single-purpose project, the multi-purpose projects and river basin development. A single-purpose project has only one objective such as irrigation, flood control, power development or navigation. A multi-purpose project could embrace two or more of these undertakings, and the basin development, much broader in scope, is designed to "develop the use of the water and land resources of a river basin" more efficiently than would be possible if the resources were developed in an unco-ordinated manner.

In the book Mr. Golze shows how the Bureau of Reclamation and the Army Corps of Engineers work together reclaiming for the nation great areas of the West. A generous number of pictures, charts and maps show how this section, with the proper irrigation, can become good farm land. It also describes the part which dams and hydroelectric power projects play in completing this sage of restoration.

Although the author is an official in the Bureau of Reclamation, and the book is said to be in substantial agreement with Bureau policies, nevertheless Mr. Golze states unmistakably that the ideas and opinions expressed therein are his and that he is responsible for any "errors or omissions that may be found."

The book, by McGraw-Hill, is $8.

McKIERNAN-TERRY PILE HAMMERS
drive 3995 piles for Long Island Bridge



McKiernan-Terry Pile Hammers driving concrete piles for new Great South Bay, Long Island, causeway and bridge.

A new causeway and bridge, connecting Captree Island and Bay Shore, is currently being built across the Great South Bay in Long Island, New York. The contractor, J. Rich Steers, Inc., selected McKiernan-Terry Pile Hammers to drive a total of 3,995 concrete and timber piles for this project.

A powerful McKiernan-Terry S-10 Single-Acting Hammer was used to drive 697 2-ft square reinforced concrete piles and 148 18-in. square reinforced concrete piles. In addition, 3150 subaqueous timber piles were punched down with a fast-driving McKiernan-Terry 10-B-3 Double-Acting Hammer.

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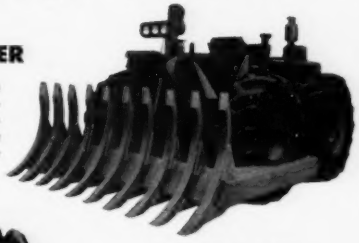

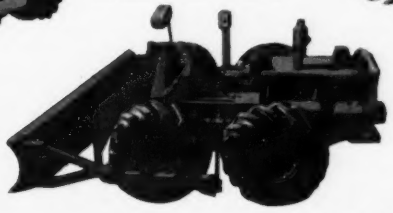

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R. G. LeTOURNEAU, INC.

Peoria, Illinois

A view of construction in early stages. Poured panels are in foreground.

Navy Tries First Tilt-up Construction Job

- Method Proves Fast and Cheap on $13-Million Project

» NAVY CIVIL Engineers are adopting tilt-up construction on a large scale for the first time in the erection of a huge Pomona, Calif., plant now going up.

Buttress and McClellan, A.G.C., Los Angeles, contractors on the project, have a patented process being used on the $13-million Pomona plant. In the erection of five main buildings and as many auxiliary buildings, the tilt-up construction method is expected to provide 1.3 million sq. ft. of space cheaper, easier and faster, with a minimum use of critical materials.

The civil works project, contracted for the Navy Bureau of Ordnance, will be operated by Consolidated Vultee Aircraft Corp. Its anticipated completion in 15 months is considered a speedy operation, considering the vast area to be placed under roof.

In effect, the tilt-up construction method is building from the outside in. Its principal feature is the forming and casting of wall panels on a deck slab. The reinforced concrete panels on this contract are 20 by 26 ft. They are 5½ in. thick and weigh approximately 20 tons each. They can be cast singly or upon each other in multiples as desired, by use of a membrane between panels.

Working from the inside rather than the outer areas of the building, a crane with a four-point hook-up and running sheave for easy load distribution lifts the panels into place. This eliminates the need for scaffolding. The use of small amounts of an admixture for higher early strength allows lifting of panels in eight days.

Each panel has tapped inserts cast in the concrete for use with a lifting attachment.

Grout leveling pads are used at each end of the grade beams. Panels are set on these leveling pads and the intervening space is later filled with dry pack for sealing. After the erection of steel columns and securing at panel joints, vertical panel joints, 5½ by ½ in., the length of the panels is filled to the column flange with a bitumastic joint filler.

The panels are held in position before erection of the steel columns by knee-brace supports, fastened to tapped inserts cast in both the panel and in the deck. A turnbuckle arrangement on the supports is used to plumb the panels.

Cranes lift panels while workers position them. Knee-brace supports hold panels in plumb as workers secure them to steel columns. Plates set in the panels at pouring make bolting to the columns possible.

The steel columns are fitted where the panels join by means of weld-on studs. Studs are capped with fastening clips which hold the wall panel to the column flange.

Tilt-Up Moves East

Tilt-up construction, although an innovation of the West, is moving East. A government warehouse, which, according to the *Wall Street Journal*, will cover 29 acres and be the world's largest warehouse is scheduled to be begun soon. Barrett & Hilp, A.G.C., San Francisco, have the construction contract for Parr Warehouse Corp., which will lease the huge structure to the government for $936,000 a year.

A view of interior scene. Panels in position await column-fastening process.

Building Construction Notes

• Seventy-nine local housing authorities in 23 states will call for bids on almost $171 million in bonds this month, according to the Public Housing Administration. This is the fourth offering of bonds by housing authorities under the Housing Act of 1949. Previous offerings are paying about 2% interest.

• California's legislature last month approved a state constitutional amendment which will permit a $185-million bond issue to finance school construction in the state. A $250-million issue in 1949 has been almost completely allocated and a serious school shortage faces the state.

• A joint state legislative interim committee in Georgia is studying proposed legislation which would require work such as plumbing, heating and wiring on state building projects to be let as separate contracts. The law was introduced in the last session and passed on to the committee for study.

• Constitutionality of Oregon's urban redevelopment law has been upheld in that state in a court decision, which clears the way for a proposed 44-block slum clearance project in Portland for industrial purposes.

• The Veterans Administration has awarded a $17,912,000 contract for construction of a 1,000-bed hospital at Los Angeles to the Cust K. Newberg Construction Co. The project is given 600 days for completion.

School Contest Reveals Popular Materials

• Sectional Favorites Seen in Design Competition

» CONTRACTORS who build schools have an idea of what goes into those structures elsewhere in the nation since the latest school design contest held by *The School Executive Magazine* of New York City.

The annual competition saw 100 plans submitted recently for judging. A look at the materials used in their construction shows some interesting similarities and differences. The entries covered 33 states, from Maine to California, and were broken down into four zones for appraisal—Far West, Middle West, South and East.

Steel and Concrete Framework

Builders in all those sections chose steel and reinforced concrete most often for structural framework. In the Far West, wood was occasionally used, in two Texas schools for the entire framing, in other instances, with steel and concrete. Brick for structural use in that area was reported only once, but it was relied on frequently for exterior facing. Redwood and Douglas fir were favorites for facing, particularly in California.

Brick was more common for exterior facing in the Middle West and combinations of cinder block for both interior and exterior were extremely popular there. The South, too, relied on cinder and slag block.

There was virtually no competition against asphalt tile for flooring, the analysis revealed. The same was true of roofing where built-up tar and gravel predominated almost exclusively in all sections.

Steel sash was favored almost exclusively in the Far West and the Middle West concurred with that choice. In the South, steel and aluminum sash divided the honors and, in the East, wood was the third preference.

Choice of Lighting Differs

Concentric ring incandescent lighting was most used type in the Far West, but the Middle West gave the nod to fluorescent lighting.

The Far West used more radiant floor heating than any other section, in contrast to the East, which stuck to convention systems.

Contest sponsors saw a diversity of wall decorations in use from coast to coast, with green chalkboard leading. The East favored many new features, such as sound equipment, prism skylights, special insulating and waterproofing units and audio-visual facilities, and, in many instances, the last word in laboratory and gymnasium equipment. The South proved quite as progressive in the same way and builders there were installing radio-visual equipment, clock and program systems, plastic dome skylights, and intercommunication systems.

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B.R.A.B. Panel Sees Ingenuity in Design as Key to Conservation

- Engineers Say Uniform Standards Will Save Steel
- Economy of Materials Should Begin with Planning

» THE BUILDING Research Advisory Board's Panel on Structural Engineering has concluded, after its appraisal of building materials conservation, that the kernel of conservation is imbedded in design practices, acceptance of universal load standards and allowable unit stresses.

"Conservation is a matter of design," the panel declared in its recent report. "This advisory panel on structural engineering recognizes ingenuity in design as the most effective and productive of all conservation measures in engineering and architectural practice."

Recommendations to Government

To secure such conservation in government contracts, the group advised more incentives and opportunities "for the fullest exercise of ingenuity in the interest of conservation by competent engineers and architects engaged to design government buildings." The top-notch group of practicing engineers and engineering deans advocated four methods to stimulate enterprising conservation on government work. They are:

- That engineering firms be selected for competence rather than on competitive bids.
- That engineers and architects be given greater latitude in design and be adequately compensated for so exercising their imaginations.
- That sufficient time be allowed federal agencies for thorough engineering studies on particular projects.
- That greater incentives be offered for conservation in design.

Another method of conservation would be submission of changes in materials or alternate design by contractors. Although not elaborating on the recommendation, the panel warned that when such proposals are invited, "the essential requirements should be made clear in advance."

In appraising other avenues of conservation open in the structural engineering field, the panel concentrated its study upon principles which form the basis for engineering design. It recognized that conservation in design "depends greatly upon the experience, competence and judgment of engineers." It also admitted that recommendations for conservation in design and building practice should be "sufficiently general to permit latitude of interpretation (for) the design problems at hand."

Particular study was made of the ways conservation could be effected in structural steel and reinforced concrete design. "All advisors and advisory groups focused their attention upon standards for loads and stresses upon the structure, allowable design stresses for materials used, and the study of other existing standards for the amount of conservation possible when using these standards as a basis for design," the report states.

Specific Counsel for Builders

Specific recommendations resulting from investigation of those phases of building activity included these:

- That a national uniform standard for occupancy loads, based on research by the American Standards Association, should be adopted for federal construction. In the meantime, all government agencies should accept the standards set by the Government Technical Advisory Group.
- That means of reducing live loads in proportion to dead loads be investigated in intensive research.
- That higher strength concrete (3,000 psi.) be used where adequate supervision is provided, if a saving in reinforcing steel can be effected.
- That "substantial economies" will result from use of the ultimate strength theory of design and that the joint cooperative committee of the American Society of Civil Engineers and the American Concrete Institute expedite completion of a code of practice to be adopted into building codes as an alternate to the conventional straight-line method of design using working stresses. Also, that government agencies permit ultimate strength designs as alternates, to pioneer and speed acceptance of the theory.
- That the American Concrete Institute expedite completion of its current study and recommendations in regard to an increase in the allowable tensile stresses of steel reinforcement.
- That in designing steel framed buildings, engineers appraise possibilities of obtaining savings in steel by welded construction, continuity, and cantilever design, as well as by composite action of steel beams and concrete slabs.
- That arbitrary standards on concrete slab thickness and percentage of steel in ribbed slabs be disregarded, provided the proportioning of the members and the percentage of reinforcing steel are determined by accepted methods of analysis.
- That accepted methods of continuous frame analysis should prevail in preference to arbitrary coefficients in continuity construction and all sections be proportioned by such analysis.
- That precasting of concrete be considered where possible savings in reinforcing steel can be expected.
- That in the initial stages of planning simplicity should govern the design. Efficiency of framing arrangement, uniformity and repetition in structural design elements should be considered.

Advocate National Standards

The structural engineering panel also advocated acceptance of national standards and continuous appraisal of technical developments for their effect upon materials conservation.

Seventeen top-flight engineers formed the structural engineering panel with W. E. Reynolds, U. S. Commissioner of Public Buildings, as chairman and Douglas E. Parsons, chief, Building Technology Division of National Bureau of Standards, as vice-chairman.

(Editor's Note: This is the second of a series of articles on the seven panel reports upon which the Building Research Advisory Board based its conservation recommendations to the Defense Production Authority. The full report contains 200 specific suggestions for saving materials, which both DPA and B.R.A.B. herald as a basis for long-term conservation. The full board does not necessarily approve all recommendations made by its panels, but "certifies to the competence and integrity of the panels" and asks careful study of their work.)

14-Year Modular Method Gains Exceed Early Hopes of Sponsors

- 50% of All Brick and Tile Production Now Modular
- Important Design and Construction Changes Seen

By Harry C. Plummer

Director, Engineering and Technology, Structural Clay Products Institute

» THE GRADUAL but continuous acceptance of modular coordination by members of all segments of the construction industry in increasing numbers is, in this writer's opinion, the surest proof that the principle is both sound and practical and is the best evidence that, as Naughton Lane stated in the July issue of THE CONSTRUCTOR:

"Modular coordination is here to stay and will be universally adopted throughout the building industry in due time."

Mr. Plummer

To those who have not followed the development of American Standard Association's Project A62 on the coordination of dimensions of building materials and equipment since its inception, the progress of the modular movement may seem discouragingly slow. However, a realist appraisal of the situation indicates that, while acceptance of modular coordination by the construction industry has been gradual, it has, nevertheless, been consistent and the advance of the movement during the past 14 years has been much greater than many thought possible when Project A62 was first discussed at a meeting of industry representatives called by the American Standards Association.

At that time, modular coordination was a theory—a challenging theory to be sure—nevertheless, largely untried. It was supported by data obtained from the construction of a few demonstration houses and by a highly technical discussion of the subject in Bemis's Volume III, "Rational Design," of the three-volume work, "The Evolving House."

At this meeting, many expressed doubts as to the practical application of the method. The time-honored statement, "It looks good on paper but it won't work in the field," was repeated many times. All present realized that the fundamental law of motion: "bodies tend to remain at rest or in uniform motion until an external force is applied to change that state," which defines inertia, applies also to human behavior and that to change the design, manufacturing and construction practices of the widespread and loosely organized construction industry, as contemplated in behalf of modular coordination, was a tremendous task.

When ASA Project A62 was formally organized in 1939, all who participated realized that it was of long-range duration and that, if the construction industry adopted the principles of modular coordination, it would do so as an evolutionary change over a long period of time. The possibility of imposing modular methods upon the industry by government edict, as was done in Germany, was never considered seriously by the sponsors of the project, and it was agreed at the outset that the development of modular standards and the adoption of modular methods of design and construction must be on a voluntary basis to insure permanent gains.

"Astonished" by Gains

With this approach to the problem, it is not surprising, therefore, that those who have followed the development of Project A62 are not discouraged by the progress which has been made, but, on the contrary, are astonished at the rapidity with which the construction industry is adopting modular methods.

Not since the development of skeleton frame construction has the construction industry been faced with such far-reaching changes in design and construction as those proposed by modular coordination, and yet, just 13 years after the organization of Project A62, a large percentage of building products are being produced in standard modular sizes. Leading architects, including a majority of the board of directors of the American Institute of Architects, have adopted the modular system as their standard design practice. Many contractors and builders are utilizing modular principles in their construction methods, and architectural and trade magazines, like THE CONSTRUCTOR, have opened their pages to full discussion of the method.

While this progress is most encouraging to those who have believed in and supported modular coordination for many years, it does not in any sense mean that the battle is won or that there are still no "headaches" in converting to the modular method, whether it be in manufacture, design or construction.

Brick and Tile 50% Modular

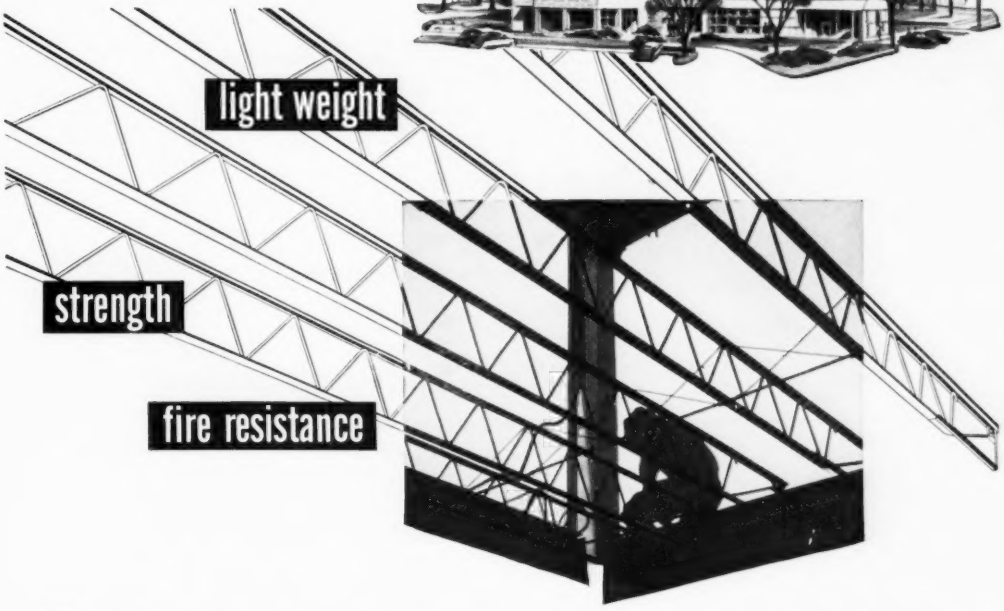
In 1943 the structural clay products industry endorsed modular coordination through its national advertising and assured architects that modular clay products would be available for post-war construction. Now, nine years later, manufacturers of approximately 50% of the total production of brick and tile in the United States have either converted entirely to modular sizes or are in the process of doing so. In some areas, this conversion involves the production of both modular and non-modular sizes which naturally complicates production, handling and shipping, and increases cost. However, because of the belief of the industry in the soundness of modular coordination, most brick and tile manufacturers who have not converted entirely to modular sizes will produce these sizes on order and, as increasing numbers of architects and builders adopt the modular method, the industry expects to convert entirely to modular standards.

Some contractors, whose comments on modular coordination have been printed in THE CONSTRUCTOR, have reported difficulties resulting from varying dimensions of masonry units. This is not a new problem nor one peculiar to modular units. If individual brick, tile or block dimensions vary sufficiently, they will not fit any layout, modular or non-modular, and cutting is inevitable. In non-coordinated layouts, however, where it is necessary to cut the masonry units around openings and at corners regardless of their size variation, cutting due to size variation is not so apparent as in a modular layout. The cutting due to size variation

(Continued on page 47)

Architect Henry Sprott Long of Long & Gatling says:

"We specified Truscon "O-T" Steel Joists for the Highland Tower Apartment Building to assure...



Hundreds of structures such as the Highland Tower Apartments in Birmingham, Alabama, indicate the trend toward lower cost per square foot construction while assuring adequate strength and safety with Truscon "O-T" Steel Joists.

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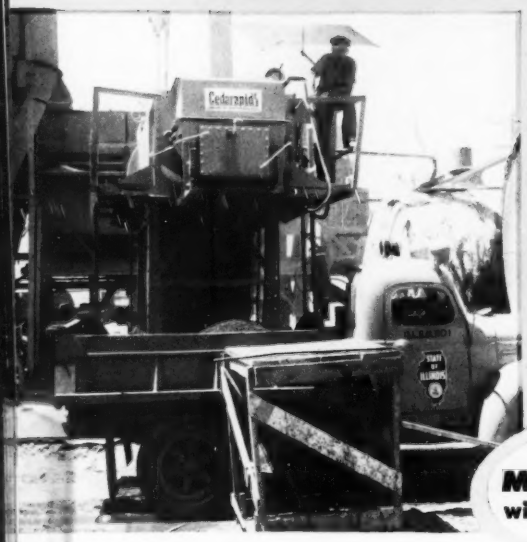
TRUSCON MARK OF MERIT PRODUCTS

TRUSCON a name you can build on

"After 8 years experience, we know



CONSTANT research by Cedarapids Engineers to make an already good machine better is another reason why so many contractors stay sold on Cedarapids. Take the new Master Plant . . . newly engineered and improved to meet increasingly rigid bituminous pavement specifications with high capacities of accurately graded and uniform bituminous mixtures. All Cedarapids equipment, both Bituminous Mixing Plants and Crushing and Screening Plants, is engineered right up to the minute to *anticipate* your needs for the most modern profit-producing machines. Big volume output at low operating and maintenance cost is another bonus feature of Cedarapids equipment that makes Cedarapids first choice with so many contractors.

Shown below is Rockford Blacktop Construction Company's new Model MM, "Master Mixer" Unit, with Model MGC "Master Gradation Control" Unit (behind dust collector) operating at Forreston, Illinois. This set-up includes a Model 30-P Portable Charging Hopper Unit and Cedarapids Model 8828-C (88" x 28') Drier Unit, which Bill Howard especially likes for its high drying capacity, along with a Model 10XH-T Dust Collector Unit. At the left is shown the discharge end of the "Master Mixer" Unit.

"Our CEDARAPIDS MASTER PLANT is loaded with all these special features"

- **QUALITY CONTROLS** continually police quality of material, make all mixes meet specifications.
- **LOW MAINTENANCE** assures extremely economical operation.
- **HIGHLY PORTABLE** for fast moving from job to job.
- **MIXING PADDLE FACES** reversible . . . adjust out to compensate for wear . . . angularly adjustable to control thoroughness of mixing and speed for mix through mill.
- **ADJUSTABLE DISPLACEMENT POSITIVE TYPE PUMP** with calibrated gauge and hand wheel control at operator's platform provides immediate and accurate pump output control.
- **JACKETED COMPONENTS** including mixer, piping, pump, discharge box . . . for steam or hot oil heating.
- **DISCHARGE GATE** power cylinder operated . . . steam or pneumatic.
- **RELIABLE BIN LEVEL INDICATING LIGHTS** immediately show operator any bin compartment, or compartments, nearly empty.
- **PRACTICAL, POSITIVE FLOW CONTROLS** automatically stop feeder, elevator and pump only, if feed of any size aggregate or mineral filler fails.
- **LIGHTS** for cut-out switches on operator's panel immediately indicate feed that fails.
- **SELECTOR SWITCH** for automatic or manual control of plant.
- **SYNCHRONIZED FEEDER** with bitumen pump always gives correct proportion of bitumen to aggregate.
- **FULLY ENCLOSED PLANT** keeps dust and heat loss to absolute minimum for better working conditions.
- **LARGEST CAPACITY MIXER** with conservatively rated capacity of 100 to 150 tons per hour. Twin shaft type conforms to all existing specifications. Giant Single Shaft Mixer also available (optional) when conditions permit use, having advantage of vigorous, thorough and complete mixing of as much as 200 tons per hour and maintaining specified mixing time.
- **HORIZONTAL VIBRATING SCREEN** on Gradation Control Unit assures accurate sizing of material.
- **FOUR COMPARTMENT BIN** for Gradation Control Unit meets all specifications.
- **OVERFLOW CONVEYOR** for Gradation Control Unit optional.
- **MINERAL FILLER ATTACHMENT** for Gradation Control Unit with interlock optional.
- **EASY CALIBRATION** designed for accurate, fast proportioning of aggregate and bitumen.
- **SAMPLING AND CALIBRATION** equipment are engineered for checking conformance to specifications.

Gradation Control Unit can be replaced by Model TEF Transfer Elevator and Feeder Unit for production of single aggregate hot mixes. Bulkhead type aggregate Feeder is available for Model MM Mixing Unit to produce single aggregate cold mix.

Get complete details about all Cedarapids money making equipment from your Cedarapids distributor today.

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

Cedarapids

Built by IOWA

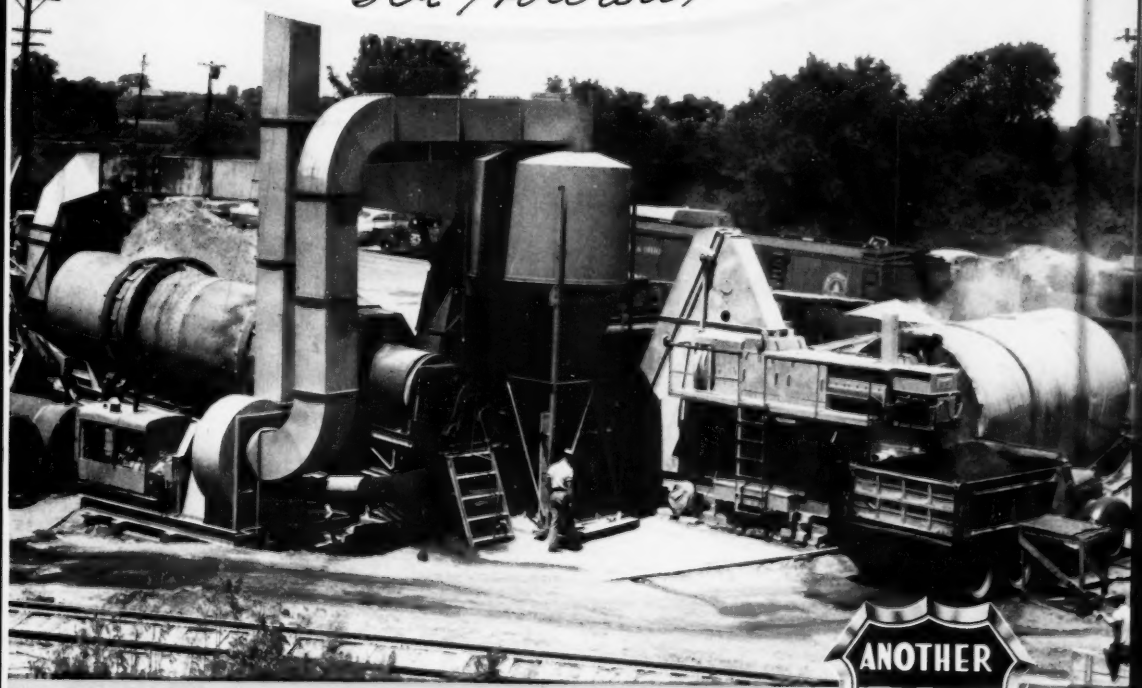
Bituminous Mixing Plants are real producers-!"

"... that's why we buy CEDARAPIDS," says BILL HOWARD

ROCKFORD BLACKTOP CONSTRUCTION COMPANY, ROCKFORD, ILLINOIS

"After eight years of operating our equipment under some mighty rigid specifications, we're completely sold on Cedarapids Bituminous Mixing Plants. They've got everything it takes to meet schedules on every job. Right now, we've got two Cedarapids Model ECW Batch-Type Plants, and we're also operating one of the new Cedarapids Master Continuous-Type Plants. That new Master Plant is really a honey! We can now supply specification mix from either of the Portable Batch-Type Plants or from the highly Portable Master Plant and easily move a plant to another job when necessary."

Bill Howard



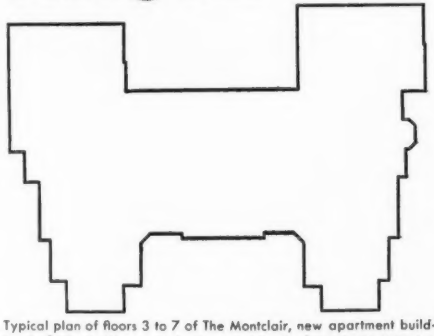
ANOTHER Cedarapids PRODUCT

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

Builders: Campagna Construction Corp., New York; *Owners:* Lancamp Realty Corp., St. Louis; *Architects:* Rosario Candela and Paul Resnick, New York; *Engineers:* Weinberger & Weishoff, New York, and George E. Wells, Inc., St. Louis.

St. Louis Apartment Building has 1075-ton Steel Frame



Typical plan of floors 3 to 7 of The Montclair, new apartment building in St. Louis. Upper stories have set-backs for private terraces.

This fine new apartment building, called The Montclair, is the first major structure of its kind to be built in St. Louis in two decades.

The Montclair is located on Kingshighway, and occupies a 380-ft block front, facing beautiful Forest Park. It is fifteen stories high, and has facilities for 206 families. Its large, well-planned rooms are grouped into apartment units of from 1½ to 6 rooms, and there are private terraces on the top five stories. Floors throughout are of cork tile, to minimize the transmission of noise.

Among numerous features of The Montclair are select shops, a beauty salon, cocktail lounge and dining room, plus a 200-car basement garage.

The Montclair has an attractive facing of gray brick, trimmed with limestone. Its 1075-ton steel skeleton was fabricated and erected by Bethlehem.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

FABRICATED STEEL CONSTRUCTION

(Continued from page 42)

is masked by the "normal" cutting. Size variation of units will undoubtedly continue to be a problem of brick and tile manufacturers due to the variable nature of the raw materials with which they have to work. However, since World War II, substantial progress in controlling this variation has been made by the industry through improved methods of blending and processing the clay and through the use of modern types of kilns.

Time Required for Conversion

While it will require some time for the entire industry, which consists of about 670 different manufacturers, many of them operating very small plants, to convert to modular sizes, the leaders of the industry believe that modular brick and tile should be the standard for the industry. As a matter of fact, even if modular coordination were not adopted by designers and the manufacturers of other building products, the advantages to be gained from coordinating the dimensions of different types of masonry units more than justify the adoption of modular sizes.

It seems unnecessary at this time to elaborate on the savings in labor and materials resulting from modular coordination. Everyone agrees that, if building products are so dimensioned that they will fit together at the site without alteration and if building plans are coordinated with the dimensions of these products, both time and material will be saved.

Method Proven by Experience

The only question is: Can this be done? I believe that the experiences of many architects and contractors, some of which have been reported in these pages, prove that it can.

In June 1944, the *Architectural Forum* published an article entitled "Building's Big Chance," and it concludes with the following, which I believe is worthy of restatement:

"With an established common denominator of dimension, building will have a unique opportunity for design improvement. Architects will find that harmony is much more easily achieved when all building measurements are related. And although details are standardized, this does not indicate standardization of the finished building. Individual design will not be lost.

"Merely because it is unfamiliar, the modular system may seem complicated at first. As a matter of fact, it never does become quite as simple as playing with blocks. Window and door calculations remain difficult except when the 4-inch modular brick is used. But when has designing a building been easy?

"With modular design, however, formerly insoluble problems will find an answer and improvements will constantly be worked out. The increased ease with which architects and builders can do their work will be a great time and cost saver. Manufacturers will at last have a realistic basis for figuring out the dimensions of their products. For the first time in its history, the building industry will no longer be flying blind."

Designs to Resist A-Bomb Blast Urged

For 3% more you may be able to make that new building withstand A-bomb shock waves, the government reports.

Contractors, architects and engineers can glean new ideas on how to increase the blast resistance of new multi-story buildings for an average additional 3% cost from a technical manual published last month by the Federal Civil Defense Administration.

Entitled "An Interim Guide for the Design of Buildings Exposed to Atomic Blast," the booklet is a temporary guide issued by FCDA while studies of the subject are still going on. Most of the information contained in the publication is based on knowledge learned from the damage done by the Hiroshima and Nagasaki blasts.

Because many Japanese buildings are designed to withstand earthquakes that are more severe than those in this country, they were able to take the bomb shock waves better than could similar ones in America. These buildings, of the reinforced-concrete and heavy steel-framed design, are the type best able to resist an atomic blast, the booklet states.

Next follows industrial buildings with connected steel frames rigidly joined and strongly braced in all directions. After this are the strongly braced wooden frame houses that are low and wide.

The last three types listed in the manual are particularly vulnerable to blasts. They include the shed-type commercial or industrial building with long-span trusses, beams, light columns and little lateral bracing with large wall and roof areas exposed; the masonry wall-bearing structures, with beams and columns or partition bearing construction; and tall, light wood-frame buildings such as a three-story house.

The trick in designing buildings capable of resisting A-bombs calls for consistent strength in the various elements of the structure as well as in the structure as a whole. The complete design should be based on a continuity of strength, particularly in principal members of the structure, and on a combination of blast load and dead load in addition to allowable stresses specified for wind.

If this is carried out, the booklet states, "structures . . . are expected to have a reasonable chance of survival" at distances more than one-half mile from the explosion of an average size A-bomb.

Copies of the manual may be secured from the local civil defense offices or from the Superintendent of Documents, Washington 25, D. C., for 15 cents.

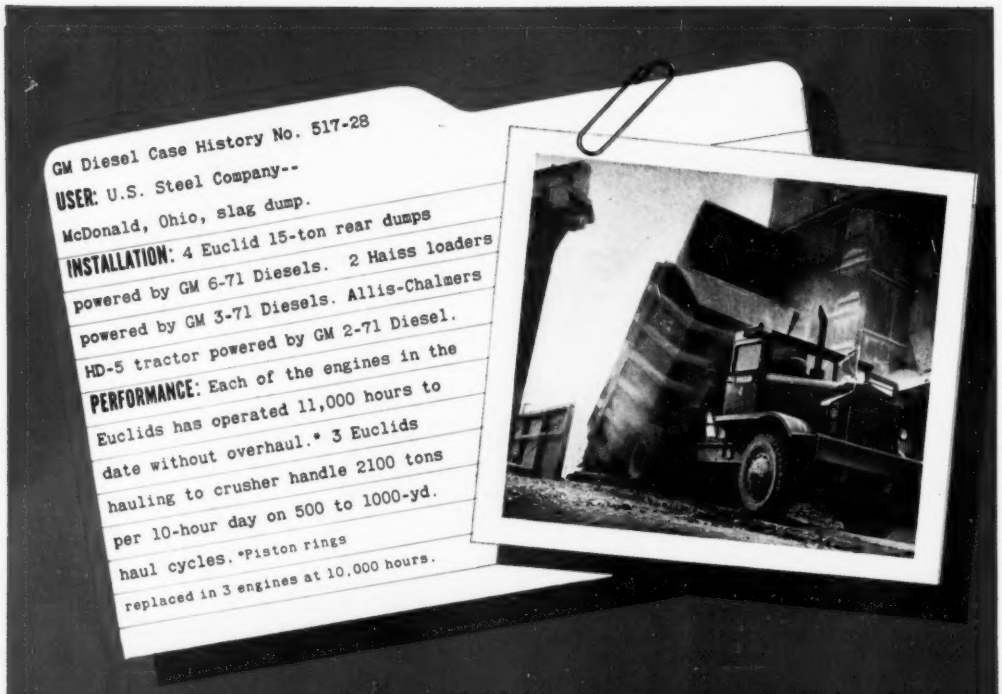
Materials Education Planned

The Joint Cooperative Committee of the Producers' Council and The Associated General Contractors of America will meet in St. Louis, Sept. 23, in connection with the council's annual meeting.

Scheduled on the committee's agenda is consideration of a recent proposal to inform contractors of new materials and developments through a new educational service. To be sponsored jointly by the A.G.C. and the Producers' Council, the program would include 20-minute lectures, motion pictures, slide films and demonstrations at A.G.C. chapter meetings.

The committee reasons that, with the full knowledge of new products and methods, contractors will be able to pass the benefits of construction research on to their clients more quickly. Also on the committee's agenda is appraisal of a modular coordination pamphlet just published by the American Institute of Architects.

The HHFA announced last month that almost one-third of the 88,456 defense houses programmed in defense areas have been put under construction.


GM Diesel Case History No. 517-28
USER: U.S. Steel Company--
McDonald, Ohio, slag dump.
INSTALLATION: 4 Euclid 15-ton rear dumps
powered by GM 6-71 Diesels. 2 Haiss loaders
powered by GM 3-71 Diesels. Allis-Chalmers
HD-5 tractor powered by GM 2-71 Diesel.
PERFORMANCE: Each of the engines in the
Euclids has operated 11,000 hours to
date without overhaul.* 3 Euclids
hauling to crusher handle 2100 tons
per 10-hour day on 500 to 1000-yd.
haul cycles. *Piston rings
replaced in 3 engines at 10,000 hours.

THIS DIESEL has worked 11,000 hours without overhaul

Power users who standardize on General Motors Diesel for all equipment on the job, as U. S. Steel has done in this particular operation, can be sure of maximum return on their investment. GM Diesel's faster acceleration means more work output and smoother 2-cycle operation means less wear and longer engine life. And, with most parts interchangeable, all Series 71 engines can be serviced with one small stock of basic parts. We're simply reporting what contractors and industrial users have told us when we say—

It pays to Standardize on

GM GENERAL MOTORS DIESEL POWER

Write for booklet "A $6,000,000 Horsepower Insurance Policy" that tells you why.

DETROIT DIESEL ENGINE DIVISION

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SINGLE ENGINES . . . 53 to 275 H.P. MULTIPLE UNITS . . . Up to 600 H.P.

Highway Construction Notes

• Public sentiment is being sounded out in Oklahoma on a proposed $102-million highway bond issue so obsolete bridges and other hazards on state highways may be eliminated.

• Missouri's State Highway Commission has taken over maintenance of 1,500 mi. of county roads in the first of a series of moves to put 12,000 mi. of rural roads under the state's new highway modernization program.

• An immediate start on a $275 million toll superhighway has been recommended to the Florida State Road Department by the New York engineering firm of Parsons, Brinckerhoff, Hall and MacDonald. The proposed four-lane turnpike would run 315 mi. from Jacksonville to Miami, with a 128-mi. cross state leg branching off Daytona Beach and to Clearwater.

• Texas invited bids last month on 667 mi. of highway construction work. Low bids on the projects were expected to total about $12 million.

• Advertisements for the first contract on the projected 241-mi. toll superhighway across northern Ohio are scheduled to appear this month and construction may begin before Nov. 1.

• Construction of New Jersey's Garden State Parkway will be temporarily financed by loan agreements with New Jersey banks through issuance of promissory notes. A November referendum vote is scheduled to determine if the state's credit will be placed behind a $285-million revenue bond issue for the 165-mi.-long project.

• Toll collections on the new Denver-Boulder turnpike during the first six months of operation totaled $175,745, far exceeding predictions by even the most optimistic observers. This rate, if continued, would liquidate the road's indebtedness by 1973, five years ahead of schedule.

• The Vermont State Highway Department is now training high school graduates in practical engineering so they can become engineering aides in the department. Thirteen young men and one young woman are currently studying mathematics and surveying under the department's direction.

• In proposing a new $40-million toll road, New Hampshire road officials reveal that out-of-staters pay for 98% of existing toll facilities.

A.A.S.H.O. Refuses Stand on Toll Roads Issue

• Highway Officials Ask Increased Federal Aid as Alternative

» INCREASING impetus of the toll roads movement has become a matter of increasing concern to the American Association of State Highway Officials. After studying a survey that reveals 22 states operating or investigating the feasibility of toll highways in their states, a special committee of A.A.S.H.O. has turned in a report that leaves the association straddling the fence on the issue.

On the committee's advice the state highway officials will refrain from taking a stand on toll financing. "The fluidity of this problem is such at the present time that the executive committee believed it advisable to submit any recommendation . . . for consideration and adoption as a national policy," the association stated.

Tolls Should Be Avoided

In its appraisal of toll financing, the A.A.S.H.O. committee reviewed both the advantages and disadvantages of the method. While adopting a stand-offish attitude, the committee of state road officials opined that "the resort to toll financing . . . are expedients to be avoided wherever possible." On the other hand, the committee advised state departments to keep well abreast of the method and learn the criteria for determining the feasibility of toll financing.

"State highway departments should be urged to inform themselves of the criteria and the methods useful for determination of the feasibility of toll financing, and, by the employment of such criteria and methods to determine the applicability of the toll method for the financing of specific highway improvements urgently required," the report stated.

But Their Feasibility Explored

In any event, the committee urged that state highway departments take "aggressive leadership in devising the particular ways and means" of raising funds for such construction. This was felt necessary so that their authority and responsibility should not be curtailed or divided "by the delegation of authority over important segments of the primary highway system to other existing or newly created agencies."

The committee saw in the federal policy of withholding aid funds from toll roads a deterrent to over-hasty adoption of the toll financing expedient. It recommended retention of that principle and asked that an extension of the principle to toll bridge construction be considered.

"The logic which supports the prohibition (of federal funds) in the one case and permission in the other rests at best upon a hair-line distinction," the officals declared. They suggested that financing of bridge construction by tolls might be discouraged if the government withheld matching aid.

As an alternate to the toll roads movement, the committee advocated increased federal aid, particularly to the interstate highway system. "Where general obligation borrowing is permissible, the assured availability of federal aid for the retirement of such bonds, issued for the construction of toll-free highways on the interstate highway system, would tend to provide a sound and acceptable alternative to the further construction of toll roads."

To that end, the committee recommended passage of federal legislation authorizing appropriations of $250 million annually for 10 years for construction on the interstate highway system only.

Texas' Gulf Freeway Opened

The 50-mi.-long Gulf Freeway, between Houston and Galveston, Tex., was officially opened to traffic last month. The $28.6-million superhighway is the longest toll-free expressway constructed since the end of World War II and has been lauded by the U. S. Bureau of Public Roads as a model thoroughfare.

The six years of stage construction on the road have made possible a route on which motorists will now be able to cover the 50 mi. between the two cities in 56 minutes. A 9-mi. urban section in Houston which carries 99,000 vehicles daily has had only four fatalities in accidents.

Construction costs on the freeway were split evenly by the state and federal governments, and the City of Houston, Harris County, and Galveston County paid for the right-of-ways.

Almost 2.4 million tons of material, about 47,500 carloads, went into construction of the superhighway.

Working on huge warm-up apron at end of 2-mi. long runway

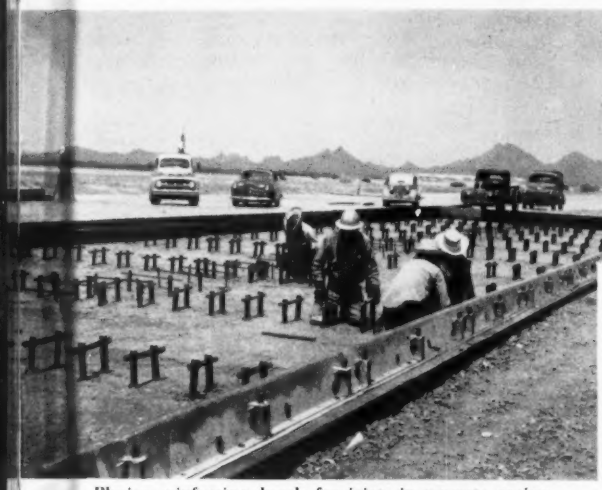
Long Runway in Arizona

Laying the longest municipal airport runway west of the Mississippi River has now been completed by Del E. Webb Construction Co., A.G.C., Phoenix, and San Xavier Rock & Sand Co., A.G.C., Tucson, joint venturers. The 12,000-ft.-long runway across raw desert was just part of Air Force plans to do $5 million worth of modernization work on the airfield.

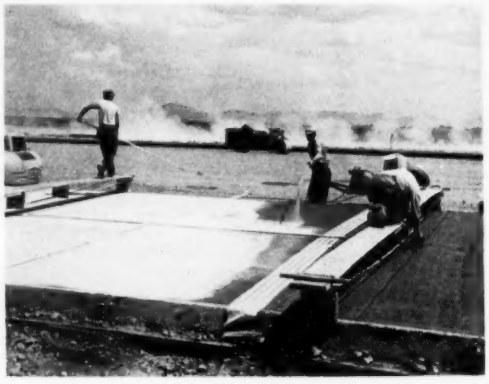
Construction of the runway, 150 ft. wide, was of 20 in. compacted soil under 4 in. of asphalt. Warm-up ramp at one end of the main runway was built of 15-in.-thick concrete, and contains enough material to construct a three-story building a city block square.

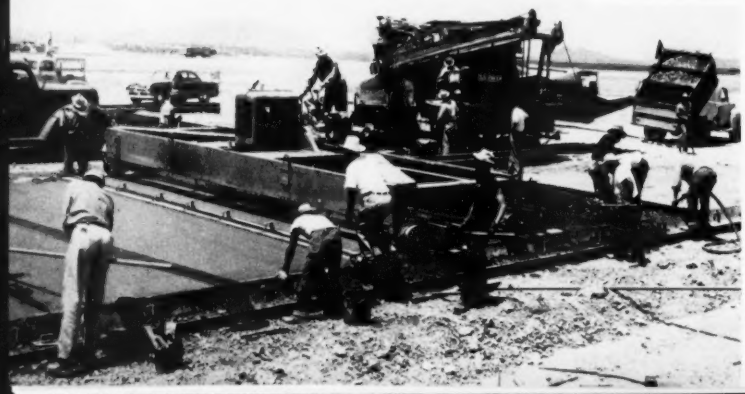
A runoff strip, treated with liquid asphalt, extends 500 ft. from one end of the main runway, bringing total length of the take-off area to 2⅓ mi. In addition, the 200-ft.-wide shoulders were treated with a dust pallative and 9,000 lineal ft. of taxiway were laid.

Building the runway called for moving more than 435,000 cu. yds. of earth, the contractor reports.



Placing reinforcing dowels for joints in concrete paving

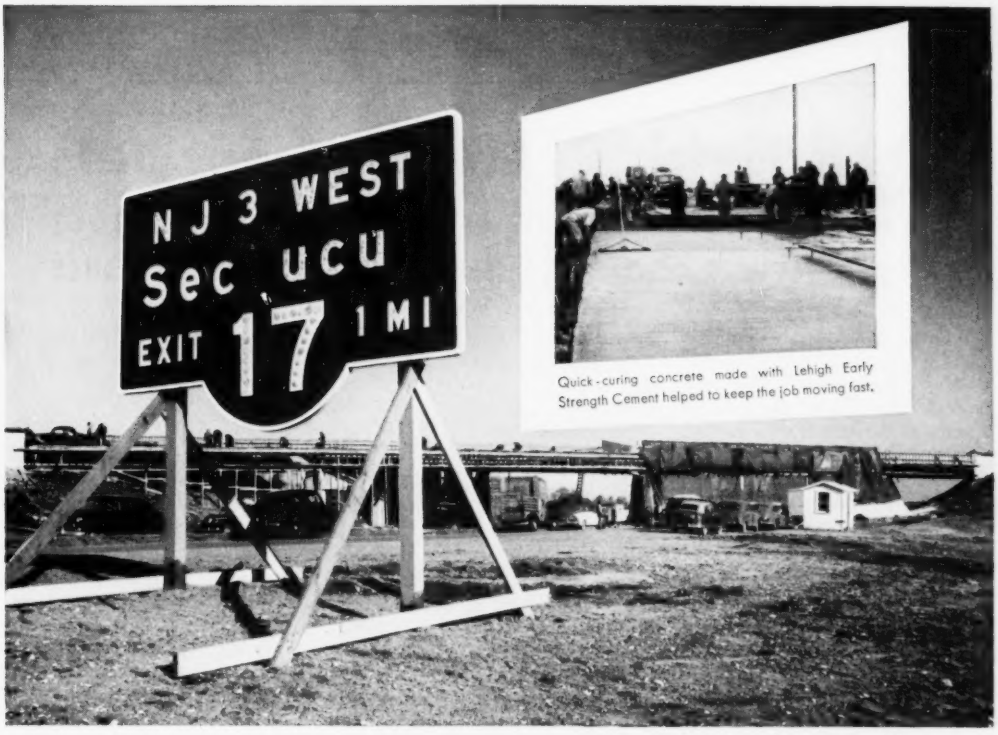




Above, worker applies curing compound to surface of pavement while man at right finishes expansion joint.

Left, another view of apron construction, with Jaeger spreader traveling on tracks atop forms to spread concrete and form expansion joints. This huge apron, as wide as 16 highway lanes when completed, is of concrete, 15 in. thick. The extra strength is required to take the pounding expected of the big B-47 bombers warming up before takeoff.

Photos Courtesy of *The Webb Spinner*



Quick-curing concrete made with Lehigh Early Strength Cement helped to keep the job moving fast.

Bridge over New Jersey Turnpike—one of four bridges on the Interchange between the Turnpike and Lincoln Tunnel.

BRIDGE DECKS READY FOR TRAFFIC, UNDERPASSES CLEARED IN 1/3 THE USUAL TIME

The Port of New York Authority wanted the Interchange between the New Jersey Turnpike and the Lincoln Tunnel ready for early public use and the work done with the least traffic interference on the highways it crosses.

They accomplished this with Lehigh Early Strength Cement. Bridge decks were ready for traffic and highways cleared of shoring in ⅓ the usual time. The Turnpike opened on its scheduled date.

What's more, important economies resulted. Form costs were cut by ½. Winter curing costs were greatly reduced; the savings on this alone amounted to considerably more than the extra cost of Lehigh Early Strength Cement.

This is typical of how Lehigh Early Strength Cement can help you save time, cut costs and meet highest quality standards.

Work proceeded as scheduled, regardless of winter weather, on bridge over Route S-3.

Built by: **THE PORT OF NEW YORK AUTHORITY**
Contractor: **POIRIER & McLANE CORP.**, New York City
Ready Mixed Concrete: **HUDSON BUILDERS MATERIAL CO.**, Jersey City, N.J.

LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

Lehigh CEMENTS

LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT • LEHIGH AIR-ENTRAINING CEMENTS • LEHIGH MORTAR CEMENT

Cecil Field "Beefed up" for Jets

BIG YELLOW TASK FORCE HELPS CONSTRUCT NEW 9,400-FOOT RUNWAYS ON THE DOUBLE

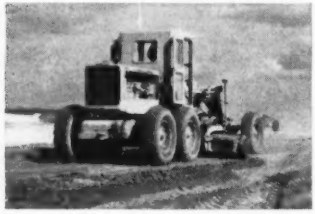
A Navy pilot returning to Cecil Field after a year's absence would notice quite a change in the layout of his old Florida base. He'd see two new runways, constructed to accommodate present and future jet airplanes. Each runway is 9,400 feet long and 200 feet wide, and land is cleared 750 feet from their center lines and ends to provide a 50-1 glide angle.

This pair of runways marks the start of an expansion program to make Cecil Field a master jet field. For the initial 1,500,000-yard earthmoving project, contractor L. G. Defelice & Son, Inc., assembled a task force consisting mainly of "Caterpillar" units. Strategic use of these big yellow machines – tractors, wagons, scrapers, 'dozers and motor graders – helped speed construction in difficult terrain. Ten big new 275-HP DW20 Tractors with No. 20 Wagons bore the brunt of the work.

In spite of very tough going in sticky sand, the DW20 teams came through with outstanding performance. Here are some typical figures from this job. After being loaded by a belt conveyor loader, the DW20 units barreled off with average loads of 23 cubic yards each. On a 4,500-foot to 5,000-foot round-trip haul, each averaged 6 trips every hour per 10-hour day. "These units far exceeded our expectations," said Project Manager Fred Sebastian. "They can't be beat for power, speed and efficiency."

"Caterpillar" equipment used on other phases of the operation included D8s and No. 80 Scrapers on leveling work, No. 12 Motor Graders maintaining haul roads, a D8 pulling a compactor and other D8s and 'Dozers leveling fill dirt. Successful contractors find that this assignment of heavy-duty tools to the zones for which they're best fitted results in higher production at lower cost. They also observe that standardization on the big yellow line pays off other ways. One is the fact that maintenance problems are centered in the capable hands of the nearby "Caterpillar" Dealer. He's a convenient source of service or information at all times!

Sticky sand is being gobbled into the jaws of this "Cat" No. 80 Scraper, push-loaded by a D8 and No. 8S 'Dozer. Ejection of heaped sand was speeded by the No. 80's high apron lift.



Good haul roads are the responsibility of this "Cat" No. 12 Motor Grader, one of several No. 12s on this job. More than 9 out of 10 "Cat" Motor Graders ever built are still in use.

Zooming across sand on big rubber tires, two "Cat" DW20s with No. 20 Wagons pass on a 4,500-foot to 5,000-foot round-trip haul. Each unit averages 6 trips per hour with an average load of 23 cubic yards.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

History of Construction Industry and Contract Method in the U.S.

(Address Before Joint Session of A.S.C.E. Construction Division and A.G.C. Sept. 3 During the Centennial of Engineering in Chicago)

By H. E. Foreman

Managing Director, The Associated General Contractors of America

» IT IS an honor to appear as a representative of The Associated General Contractors of America to pay tribute to the American Society of Civil Engineers at the celebration of its first 100 years of service.

We wish to salute as well the 60 other national or international engineering societies which are participating in this Centennial, no doubt the greatest assembly of engineers in history.

This joint session of the Construction Division of A.S.C.E. and the A.G.C. is particularly appropriate because civil engineers and general contractors are members of the construction team which has done so much to make the United States a leading nation of the world.

In recent years there has been a steady increase in the proportion of men in executive and ownership positions in general contracting firms who are civil engineers. This, we believe, indicates that the business of construction is constantly becoming more complex so that a sound engineering training is essential, and also that there is constant improvement in the quality of construction men.

Certainly it is significant that the Construction Division has grown from its original membership of 1,615 when it was established in 1926, to more than 12,300 at present, making it the largest A.S.C.E. division. This is perhaps appropriate because construction now has become the largest single industry in the nation.

Your records show that approximately 40 per cent of the membership of the A.S.C.E. Construction Division are owners, executives or managers of contracting companies.

The title which has been assigned to me today is: "Development of the Construction Industry and the Contract Method in the United States." Let me say first that the subject is so vast that there will be time here for little more than a brief introduction.

Apparently those who have been engaged in the construction industry, not only in this country but throughout the world in all ages, have been so busy doing their job that they have not taken the time to record their activities for history.

My purpose here will be to mention briefly a few highlights to illustrate significant points about the construction industry and the vital part it has played in the development of the nation.

Construction Through the Ages

The history of the human race is in large part the story of man's struggle with his environment. In that struggle the basic needs of men and women have been food, clothing and shelter. Of these the most durable is shelter.

As far back in history as archaeologists have been able to find traces of human life they have also found evidence of construction. Presumably one of the first wants of man was to provide shelter in which to live.

But as soon as civilizations began to develop there arose the need for structures and facilities for the production of goods, trade and commerce, transportation, education, religion, the development of natural resources, public buildings, safeguards to health, life and property and the many other types of facilities which our modern civilization has found necessary or desirable.

All too little is known about the construction industry in the ancient world when some of the wonders of early times were built. But in ancient

H. E. Foreman

A native of Dayton, Ohio, Mr. Foreman graduated from Ohio State University in 1919 with a degree of Bachelor of Civil Engineering, taught for a year at the university, then held various engineering positions connected with construction work in Illinois, Indiana, Ohio and Pennsylvania. He held several positions with the Ohio State Highway Department before joining the A.G.C. staff in 1929, where he served as field engineer, assistant engineer, and assistant managing director prior to becoming managing director in 1940.

He received a law degree from Franklin University at Columbus, Ohio and was admitted to the Ohio State Bar in 1928. He is a member of the Ohio State Bar Association and the Columbus Bar Association.

Centennial of Engineering

The Associated General Contractors of America took part in the Centennial Convocation of the American Society of Civil Engineers in Chicago at a luncheon and technical session sponsored jointly with the A.S.C.E. Construction Division on Sept. 3. H. E. Foreman, managing director of A.G.C., addressed the luncheon on "Development of the Construction Industry and the Contract Method in the United States." D. W. Winkelman, past-president of A.G.C., whose topic was "Construction—A Growing Field For the Civil Engineer," and Lester C. Rogers, vice-chairman, A.G.C. Labor Committee, topic, "Labor-Management Problems in the Construction Industry," spoke at the technical session.

The texts of the addresses by Mr. Winkelman and Mr. Rogers begin on pages 72 and 78, respectively. Archie N. Carter, manager, Highway Contractors' Division, A.G.C., was a speaker at a session co-sponsored by the Construction and Highway Divisions of A.S.C.E. The title of his talk was "The Influence of Modern Equipment on Highway Construction." Other A.G.C. members appeared on the centennial program. A further report will be made in the October issue of THE CONSTRUCTOR.

Greece when many of the structures were built which are still famous today, Greek law and custom prescribed relationships between the contractors and the government which are strikingly similar in principle to the contractual relationships which prevail today.

The contractors were required to work continuously, to hire sufficient numbers of qualified workmen and to guarantee quality of performance. There were penalties for delays or failure to complete the work. Payments were made in installments as columns or pediments rose to completion. The precedent was set that a percentage of the contract price be retained until the project was completed.

Firms Grew in Roman Day

It was during the days when Imperial Rome ruled a great portion of the world that construction companies much as we know them today came into being. Their Greek predecessors worked independently in small groups. But the Roman contractors formed large companies to undertake the huge construction projects of the time. They came to realize the complexity and the risks which were involved. They believed that by incorporating many talents under a single management the risks could be minimized and better controlled. The Romans who undertook whole projects were awarded their contracts under a bidding system similar to that which exists today.

After the fall of Rome the construction industry as such seems to have generally faded from view. Construction of a durable nature that was continued during the medieval days seems to have been carried on by the churches and was concentrated in the construction of cathedrals, abbeys and works of that nature.

In Egypt, where it has been estimated that there were barracks for 4,000 workmen to prepare the stone for the great pyramids, and in Mesopotamia where there were great irrigation projects, much of the actual construction work was done by slaves, who were often prisoners of war. This seemed to prevail also in Greece and Rome, although some of the more skilled workers were freemen. The designers, who were also responsible for execution of the work, were men in high position at court.

What little is known about contractors of medieval England points to their rising out of the ranks of free masons. Training was later specialized to develop two types of masons: one skilled in actual stonework and the other who planned and designed buildings. The former apparently was the forerunner of the modern contractor; the latter, of the modern architect.

Rules for the mason's craft were drawn up in London in 1356. One of the most interesting rules is one which provides for a guarantee of ability and responsibility. As described by Martin S. Briggs in his "A Short History of the Building Crafts":

"Anyone undertaking a contract was to come before the good man for whom he was going to work, with four or six experienced masons who should swear that he was capable of doing the job, and that if he failed they would themselves complete the work on the same terms."

The builder, in early England, was the master mason who had the three functions of designer, builder and master of the works who supervised the operations to make certain that the work was done properly and the workmen were paid according to their ability.

While there has been developed in this nation a construction industry which is unique, just as the nation itself is unique, its principal roots came from England.

Development of the Industry

The early methods, materials, contract forms and practices of the industry came primarily from England and from the other European countries from which the settlers came. Written contracts were in use in the early days.

Mr. Sumner C. Powel has reported in the Journal of the Society of Architectural Historians that the first full contract recorded in the town of Sudbury, Masachusetts, in 1642, provides in part as follows:

". . . . the said Ambrose doth promise to build a sufficient cart bridge over the river three foote above highwater and twelve feet wide from the one side of the river to the other, provided that the towne doth fell & cross cutt the tymber and saw all the plank and carry it to place and when it is ready framed, the town doth promise to help him to raise it."

In another contract in Sudbury, dated February 17, 1642:

"It is agreed betwen the townemen of the towne on the . . (one part) . . . and John Rutter on the other part that the said John . . . for his parte shall fell, saw, hew a frame house for a meeting house thirty foote long, twenty foote wide, eight foote between joynte, three foote between studde, two cross dorments in the house, six clear story windowes with four lyghts a peece and foure with three lyghts a peece and to ententise between the studde which frame is to be ready to raise the fourth weeke in May next.

"And the towne for their parte do covenant to draw all tymber to place and to help rayse the house being framed and allsoe to pay to the said John Rutter for the said house six pound, that is to say three pound to be paid in corne at three shillings a bushell or in money in and upon the twenty-seventh day of this present month and the other three pounds to be payd in money, corne or cattle, the corne and cattle to be prized by two men of the town, one to be chosen by the towne and the other to be chosen by John Rutter, and to be paid at the time that the frame shall be by the said John Rutter finished."

Start Followed Revolution

The American construction industry did not get its real start until after the Revolution. England had used the American colonies primarily as a source of raw materials for its factories. Much of what was built during colonial days was done by the British or under their direction. It was not until the United States became independent that it set out by its own efforts to become self-sufficient.

After the American Revolution there was the immediate need in this country for structures to house manufacturing processes so that goods formerly supplied by Great Britain could be produced at home.

The American Peoples Encyclopedia reports that "the history of construction in the United States reflects in an exaggerated form the forces of industrialism which combined to cause fundamental changes in building, and to constitute the activity as an 'industry' in its own right throughout the Western civilization."

As a result of the need for large industrial buildings, the Encyclopedia reports, the amateur designer and the anonymous builder yielded to the professional architect and workman, and building design changed to meet new needs.

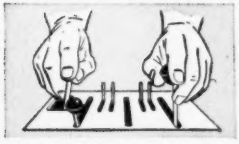
Techniques and methods still fol-

"Best money I ever spent,

was when I bought my K-595," says Canadian coal stripper

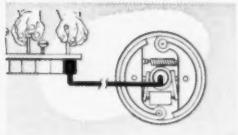
STRIPPING COAL NEAR CHIPMAN, N. B., is a K-595 Link-Belt Speeder 3-yd. dragline with 90' boom owned by Willard Wasson. Overburden runs from 12' to 50', the seam from 12" to 24". The K-595 works two 9-hour shifts daily, averages 120 tons of coal per shift. Operators Calvin Austen and Harold Naugler say it's the finest dragline in the Mento and Chipman fields—easy to operate and always ready.

These Link-Belt Speeder PLUS FEATURES speed output, cut downtime



Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.

Eliminates up to 150 parts—cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."



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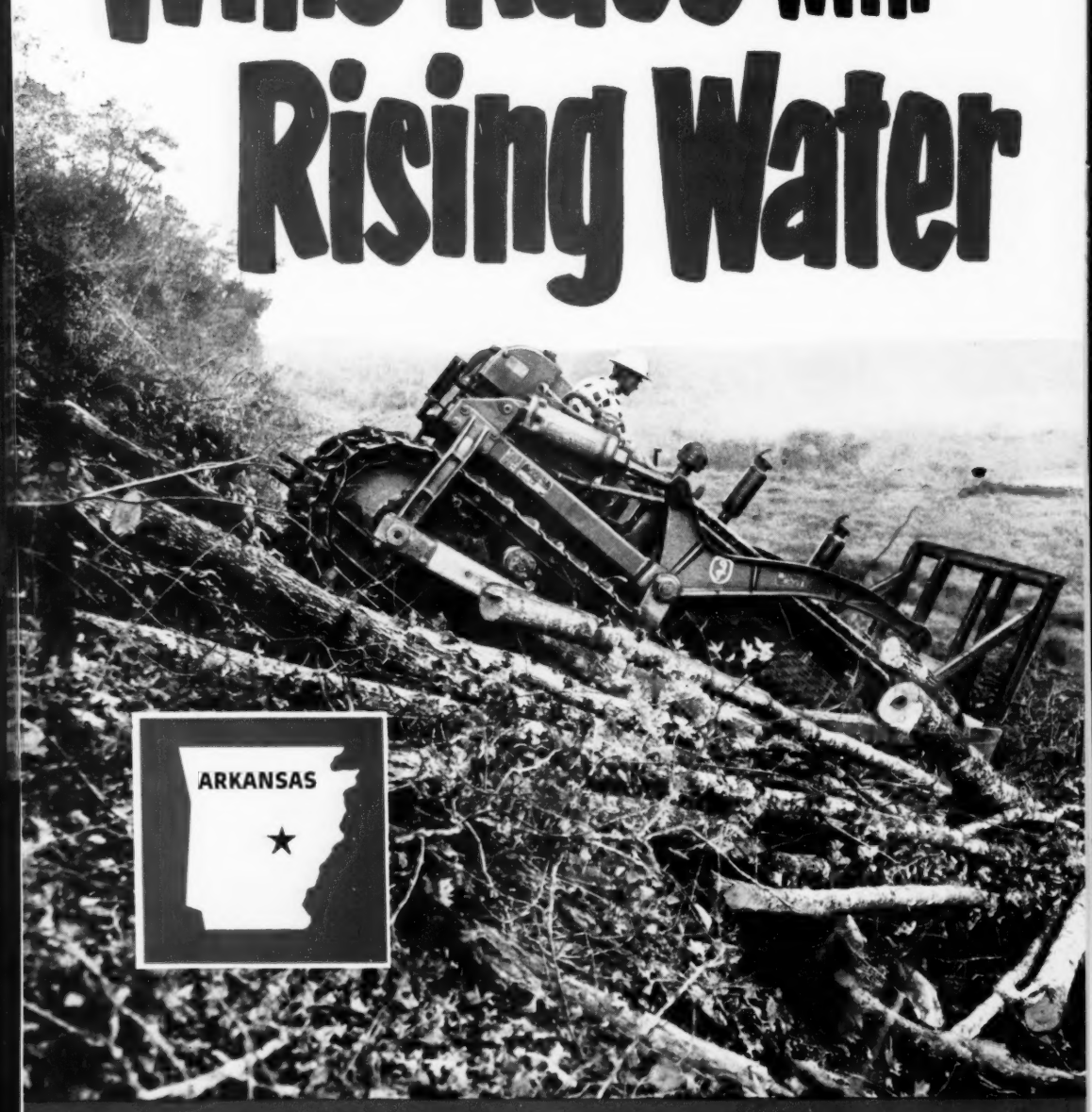

Team of IH crawlers clears reservoir in the mountains while White River backs up behind Bull Shoals Dam

The minute they closed the new Bull Shoals Dam on Arkansas' White River, water started backing up over ground still covered with trees and brush. It had to be cleared and cleared fast, and one of the crews on the big job was Patton Construction Co.

Patton tackled the steep, overgrown slopes with 150 men and six International crawlers ranging from TD-18A's down to a TD-9. Each crawler averaged 10 acres cleared a day—*"remarkable, in this rough Ozark Mountain country,"* says Tractor Foreman Hallie Goldsmitt.

And operator W. W. Sloane, adds, *"We go up these mountainsides forwards, backwards or sideways—but we go up somehow and we get the job done because these Internationals have the power."*

Ask your International Industrial Distributor today for details on the whole International line of rugged red crawlers. Ask about his service, too—and his complete stock of spare parts for any emergency. Get all the answers—and put International "Power that Pays" to work for you!

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DOWN the hill goes a TD-18A, and down go the trees that stand in its way. International crawlers have what it takes, both in sheer dogged power and rugged reliability.

SEE YOU AT THE POLLS!

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INTERNATIONAL

POWER THAT PAYS

UP comes another TD-18A, hitting fast and hard on a job where speed counts in beating the rising waters backing up behind the dam to create a new reservoir.

lowed earlier procedures. But the needs of factories for large rooms, floors and walls of great strength to support heavy machinery, illumination, temperature control, ease of mobility for materials and personnel demanded more than could be supplied by previous structural theories and customary techniques. These demands led to the development of new techniques.

A decisive point in the history of American construction, the Encyclopedia reports, was the elevation of the mechanic to the rank of engineer, with a professional status distinct from that of the architect.

The Encyclopedia adds: "The engineer's dedication to technology assured the rapid development of new methods and new processes to which subsidiary industries could contribute an increasing share."

Early American Construction

Some of the construction work in the early days of the nation, during the first half of the last century, gives an indication of how the industry developed, and how important it was to the opening up and development of the country.

For more than two hundred years after the early settlements in Virginia and New England, the rivers were the principal highways and colonial America expanded along those waterways, first up the rivers flowing into the Atlantic and then down those flowing to the lakes and the Mississippi.

But under the pressure of continued and rapid expansion these natural means of transportation and communication became inadequate, and it became essential to provide access to that large portion of America removed from the coastline and principal waterways.

So canals were built to furnish a route for settlers to go West and make possible their livelihood after they got there. During the early decades of the 19th Century, civilization spread rapidly along the rivers and into the wilderness through a spreading network of canals.

The first canal begun in this country was the Dismal Swamp Canal in Virginia. It was started in 1787 and is still the oldest canal in use in the United States. The first canal to be completed in this country was built at South Hadley, Massachusetts, from 1792 to 1796. It was financed privately with funds raised partially by public lottery. In England and the United States this seems to have been a popular way to raise funds for canals.

The first major canal was the Erie Canal which was opened to traffic from the Hudson River to Buffalo in 1825. This canal paid its own expenses and all those of New York State for many years, and millions of its surplus were later used to develop the state's early railroad lines. This canal was one of the principal reasons for the growth and development of New York City as a major port.

Early canals in this country were built by private stock companies because the authority of the Federal Government to construct such, as canals or highways, was a bitterly contested political issue.

The contract method of construction was used. Contracts were usually for short stretches enabling many contractors to work on one canal. At one time there were 6,000 bids for contracts to be awarded on 110 sections of the Ohio canals, varying in length from 2,000 feet to 14 miles depending on the number of locks or other structures per section. This work attracted not only local bidders, but those who had worked in other states.

Despite floods, malaria, labor shortages and a lack of trained engineers, contractors built more than 4,500 miles of canals in the United States from 1800 to 1850 at a cost of more than $200 million. Ohio alone had a canal system almost a thousand miles in length.

By joining the inland areas with the Atlantic, the canals launched the development of the Middle West. The economic benefits were incalculable. Examples such as the following from Ohio are typical:

From 1820 to 1840 population increased from 581,000 to more than 1,500,000. Property value increased from $59 million in 1825 to $440 million in 1850. Also the price of flour increased from three dollars to six dollars a barrel between 1826 and 1835, and the price of wheat trebled between 1820 and 1832.

Highway Need Foreseen

The need for a comprehensive system of adequate highways was foreseen more than a hundred years before it approached a semblance of reality. There has been a complete cycle in the relation of the Federal Government to highway construction during the nation's history.

First the Federal Government participated directly in the work. Then it retired and turned the work over to the states. They in turn left it to counties or other local authorities until New Jersey reversed the trend in 1891 by state aid. The current federal aid system was established in 1916.

The importance attached to early roads is evidenced by the Act of 1802 which authorized admittance of Ohio to the Union. This contained a provision setting aside five per cent of the net proceeds from the sale of public land in that state for the construction of public roads leading from the navigable waters emptying into the Atlantic to Ohio's border and through the state.

Early Federal Road

One of the first roads built by the Federal Government was financed by funds resulting from the sale of public lands in Ohio which amounted to over $600,000 by 1806. In that year Congress appropriated $30,000 of that sum and authorized the President to appoint a commission of three "discreet and disinterested citizens" to lay out a road westward from Cumberland, Maryland. This was the beginning of the famous Cumberland Road, now U. S. 40, which had been strongly advocated in 1785 by George Washington, who as a Colonel in the British Army in 1754 had widened the trail at Wills Creek, Cumberland, Maryland, to allow passage of his artillery.

On May 8, 1811, Henry McKinley, a Maryland contractor, signed a contract with Albert Gallatin, Secretary of the Treasury, for a section of that road starting in Cumberland and "ending at a place on said road two miles and two hundred and forty-six perches distant." A perch was 16.5 feet or the equivalent of a rod in length. For that he bid and was to be paid $21.25 for each perch.

The contract contained essentially the same features as present-day contracts. It was publicly advertised and awarded to the lowest bidder; a completion date was established with a penalty for non-fulfillment; provision was made to assure payment to subcontractors and suppliers, and a schedule of partial payments to the contractor was set.

On or near the Cumberland Road two important events in road building occurred: the first macadam surfacing in the United States was laid on an 11-mile stretch between Boonsborough and Hagerstown, Maryland, in 1823,

and the first cast-iron bridge was built in Brownsville, Pennsylvania, in 1839; both by contractors.

Construction of the Cumberland Road was supervised by the Corps of Engineers.

Another great factor in opening and developing the nation during the early 1800's was the railroads. Valuable as the canals were, there arose pressing needs for additional methods of transporting goods from the Middle West to the East across the mountains.

The first railroad to be chartered and built in the United States was the Baltimore & Ohio, the first stone of which was laid on July 14, 1828. Construction was begun on the route between Baltimore and Wheeling which had been surveyed by the U. S. Topographical Engineers, now the Corps of Engineers.

The value of the contract method of construction was apparent to the founders of the railroad. On July 14, 1828, notice was publicly given that between August 1 and 11 proposals would be received for the grading and bridge construction on the first 26 sections from Baltimore to Ellicott's flour mill, a distance of 12 miles away. Contractors were at work on all sections by October 1.

Contractors' Value Recognized

Value of the use of contractors is indicated by the second annual report of the president, who stated in part:

"The directors are not aware that any prejudicial consequences resulted from the short notice which preceded the first letting, or that greater competition would, at that time, have caused any material change in the contract prices, which, although they are believed sufficient in every case to insure the contractors against loss, are not thought to be generally higher than has usually been paid under similar circumstances.

"So great, however, are the increased facilities now experienced from the improvements which have been introduced by the contractors on several sections by means of temporary railways for the removal of earth, that a great reduction of cost will accrue to the contractors. The profitable results of these improvements will be felt in subsequent contracts."

This prediction proved true, prices being lower on the next lettings, and the ingenuity of contractors reduced the cost of the entire line.

After the Civil War the new industrialism expanded throughout the country with lightning rapidity. The great fire in Chicago in 1871 accented the need for fireproof construction. The availability of steel in the middle 1880's revolutionized building construction because the steel framework could support the weight of the building and walls no longer had to be so heavy or so thick.

In the 1870's Portland cement came into being and with it came a great influence on design and construction in nearly all fields.

First Steel Skeleton Building

It was in Chicago in 1885 that the first building with a steel skeleton was built, revolutionizing building construction. It was the Home Insurance Building on the northeast corner of South LaSalle and West Adams Streets. Heated arguments which developed in later years as to the validity of this claim were settled in 1931 when the building was torn down. Three committees of engineers and architects investigated and agreed that it was in fact the first building to utilize skeleton construction as the basic principle of its design.

One of the greatest contributions America has made to construction has been in the development and use of machinery. While the first steam shovel was built in 1837, the greatest development in machinery was in the latter part of the 19th Century, and during this century. Horse drawn scoops were used as early as 1805, but the development of the powerful scrapers did not come until this century.

The Fresno scraper, the horsedrawn forerunner of the bulldozer, was patented in 1882. While steam tractors were used in agriculture as early as 1890, it was not until 1903 that the first crawler tractor was manufactured. The use of low pressure heavy duty tires for construction equipment did not come into use until the 1930's after the contractors on the Bay Bridge in San Francisco had used airplane tires on some of their equipment.

When one reviews the past one hundred years in construction one cannot help but be impressed by the tremendous changes and the tremendous strides which have been made during that period.

While there were marvelous construction projects in the past such as the Pyramid of Cheops, which took 30 years to build, and has, incidentally, half the volume of Boulder Dam which was built in five years; the 4,000 mile Inca highway which rises to heights of 15,000 feet; the Chinese Wall and hundreds of others, they are particularly remarkable for having been built almost entirely by hand.

A hundred years ago most American construction was by hand, and aside from some use of cast iron or wrought iron little change or improvement had been made from the past.

Today, such challenges as the unprecedented dams, irrigation, flood control and power projects of the West are taken in its stride by the construction industry. In just one phase of the industry, the building of highways, it is worthy of note that construction contracts awarded by state highway departments throughout the country in one year, 1951, were for a total of 54,650 miles.

The Contractor

There is evidence that from the earliest times after the settlement of some of the American colonies it was the practice to have construction performed by contractors with written contracts.

When buildings were primarily of wood, or brick and stone, the contractor generally was the master mason or master carpenter.

But when structures became more complex; when steel, concrete and other new materials came into use; when plumbing, heating, lighting and later, elevators were incorporated in buildings, and when new machinery came into use it was no longer possible to have all of the work under the direction of the mason or carpenter.

When the industry was undergoing its period of fast growth and change after the Civil War there were apparently also growing pains in the organization of the construction industry. It became necessary to develop some kind of an organization which could combine and coordinate the various skills which were required for these new features of building.

While more research needs to be done on this turning point in the construction industry's history, it appears that somewhere during the middle 1880's the general contractor, such as we know the organization today, first becomes recognizable.

Before the bona-fide general contracting firms were organized to take the complete and undivided responsibility for the execution of a project, it appears that sometimes the architect or engineer who designed the project also coordinated the work of the vari-

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Tamping — Tractair with Le Roi-CLEVELAND Multiple Tamper and work-saving air feed keeps up with three men shoveling or a backfilling tractor. You not only get faster, easier tamping, but also better compaction and lower costs.

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Your digging job too small for a power shovel? Too big to do by hand economically? Then, mister, you're money ahead with a Le Roi Tractair-Backhoe! It's a hydraulic backhoe attachment mounted on a Tractair, Le Roi's combination 35-hp tractor and 105-cfm compressor — you get both air power and digging power in a single piece of equipment.

Tractair-Backhoe units are saving money for contractors every day. Take John Proszek, plumbing contractor of Chicago, Illinois: He uses a Tractair-Backhoe to dig two ditches 60' long x 6½' deep for new home-service connections — and does in half a day what it took two days to do before!

The versatility of Tractair helps you do many jobs with greater speed and economy. Its *air power* lets you break through pavement or frost — run air tools. Its *digging power* lets you dig as deep as 7' — cut through hard ground that a pick and shovel can't penetrate — keep the bottom of a ditch perfectly level — dig straight-end walls and square corners.

But that's only part of the Tractair story. There are other attachments you can use to multiply Tractair's usefulness and hold down your investment in special equipment. With Le Roi-CLEVELAND air tools, you can break pavement, drill rock, dig clay, tamp fill, etc. With a front-end loader (it has 8 accessories you can interchange quickly), you can load, lift, backfill, plow snow, etc.

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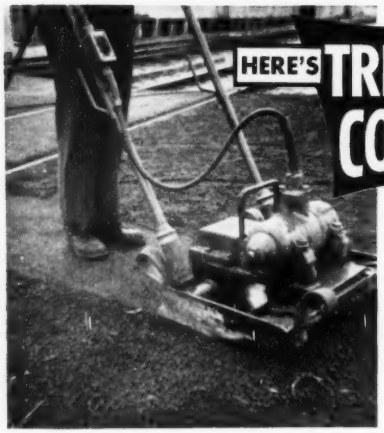

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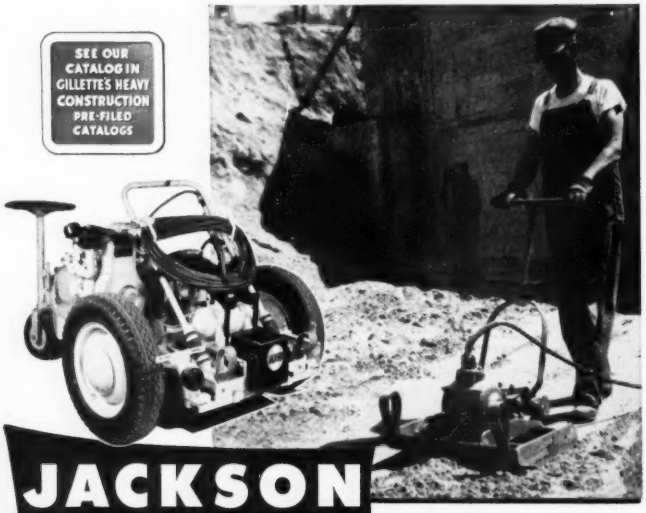

JACKSON VIBRATORS INC. LUDINGTON, MICH. U. S. A.

ous individual contractors and supervised their operations. Sometimes this function apparently was fulfilled by the owner or a representative for the owner such as the Corps of Engineers in the case of government construction.

Early contracts were much the same as now, calling for guaranteed quality, penalties for delays or failure to complete the work, assurance that suppliers, subcontractors and labor would be paid, and periodic payments with a percentage retained for payment on completion and acceptance.

Most public works contracts seem to have been awarded after competitive bidding, as is the custom today, and they were at firm prices or so much per unit.

In private work, there appears to have been some use of cost plus a percentage contracts, but that type of contract has been almost entirely replaced by the cost-plus-a-fixed-fee contract.

There is considerable evidence in the earlier days that work privately financed was undertaken and completed without formal contract; that much of it proceeded under verbal understanding or was based on letters.

Construction Industry Today

A good way of making evident the development of the construction industry in the United States is to glance at its present activities.

During 1951 the construction industry was the largest single industry in the United States. The volume of new construction put in place was more than $31 billion according to the revised estimates of the Departments of Commerce and Labor. In addition approximately $9 billion worth of maintenance and repair operations was performed to bring the total volume of construction activity to $40 billion.

This exceeded the total value of agricultural production, which normally has been the greatest industry in the nation. Nearly one dollar in every eight created in end products and services in the United States was a construction dollar in 1951.

Throughout the year an average of two and a quarter million men were employed each month by general contractors and subcontractors at the sites of construction projects. For each man working at the site, from two to four other jobs were created elsewhere in the production or transportation of materials and in the performance of services for the industry.

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billion was privately financed, and more than $9 billion was invested from public funds. Of the private funds invested, almost $11 billion went into residential construction; more than $5 billion was invested in nonresidential building, for industrial, commercial, religious, educational, health and other institutional purposes, and more than $3 billion was for public utilities.

Of the public funds, more than $3 billion was invested for educational and other public institutions; approximately $2½ billion for highways; almost $1 billion for conservation and development of resources, and more than $1 billion for military construction.

During the first six months of 1952 another record of nearly $15 billion in new construction was established. There is the possibility that if materials are available during the balance of the year another annual record of more than $40 billion in construction will be established.

The impetus for a large volume of construction this year is from military, industrial and public utility construction.

These figures on construction activity are too big for most of us to comprehend readily. But they do clearly indicate that the construction industry is performing a tremendous amount of work for the nation and all of its communities.

Progress Through Construction

Construction now is not only a huge industry, but its work is fundamental to the growth and development of the nation and its communities and it plays a part in practically every aspect of our civilized life.

In our association we have used the phrase: *America Progresses Through Construction.* We believe that to be true. And we believe also that the role of the construction man, like that of the engineer, is little understood by the general public.

One of the reasons the United States has become a great nation is because there has been not only the genius, the foresight and the courage to develop new industries and better ways of developing our resources but also because there has been a progressive and ever-developing construction industry which could fulfill the nation's needs for physical facilities—an industry which has striven to retain its flexibility.

Essentially it must be broadly dispersed in all phases to meet local needs promptly. Through joint ventures the construction industry has learned to put its units together in any combination necessary to do the job. It must be present in all its phases at all times in every community if the full function of the industry is to be performed.

While we do not have accurate statistics on the volume of construction in the early history of the nation, a brief reading of history will indicate what a tremendous role in the country's growth has been played by the construction industry in building for many purposes: industrial, conservation and development, transportation, commercial, residential, community, governmental, health, educational and institutional, national defense, civil defense and disasters.

The industry has also kept pace in providing facilities for recent developments in aviation, electronics, atomic energy, etc.

These are some of the reasons why all of those men and women who are a part of the construction industry in one capacity or another can and do take pride in their accomplishments.

Other Jobs for Construction

New construction is probably the most spectacular function of the construction industry, but it has many other jobs.

In order to be most useful the physical facilities of the nation which were built by the industry also need to be maintained, repaired and remodeled from time to time to fit new conditions. Nearly a quarter of the industry's work is for this purpose.

In times of disaster such as earthquakes, tornadoes, explosions, floods, heavy snows, etc., the damage needs to be repaired and water, light, gas and other facilities need to be restored to operation. This is another task of the construction industry.

In instances such as the explosion at Texas City, the tremendous snows in the Great Plains states, the floods in the Kansas City area and other emergencies, contractors and others in

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INDUSTRY RELATIONS

the industry have mobilized immediately in cooperation with civic authorities and started their workmen and their machines to clearing debris and repairing damage. Sometime later they took the time to consider what should be the proper compensation.

The A.G.C. Affiliation Program

The A.G.C. has cooperated with the Federal Civil Defense Administration and has submitted a comprehensive plan on how the facilities of the industry can best be mobilized in the event of an emergency, and many other organizations in the industry have done likewise.

In 1947 the Army initiated its Affiliation Program by which reserve units are recruited and trained for call to active duty when necessary in which each man is specially fitted for his military assignment by his civilian work. The A.G.C. was asked to cooperate with the Corps of Engineers in sponsoring and recruiting reserve construction units.

So far 76 units have been sponsored and 21 have been called to active duty. Two have been engaged in Korea where they have performed outstanding engineering feats in that campaign. There are also two units in the European Theatre. Many engineers, architects and others in the industry have joined these units.

These activities of the construction industry serve to emphasize why the industry is so fundamental to the welfare of the nation and its communities.

National Defense

The foregoing is a natural outgrowth of the record of the industry in World War II. Construction is as important to the national defense as it is to the peacetime development and progress of the nation.

For World War II the construction industry completed work valued at more than $49 billion. This work constituted at that time the world's greatest single construction program, and it represented an expenditure of approximately $400 for each man, woman and child in the country. The war was actually won by fighting men, but they had to be supported by the products and services of American industry. One of those industries was construction.

Camps virtually as complete as cities had to be set up before men could be trained and sent overseas. Factories had to be constructed before

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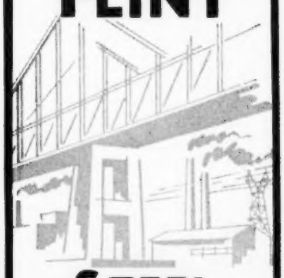

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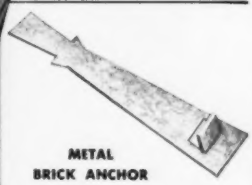
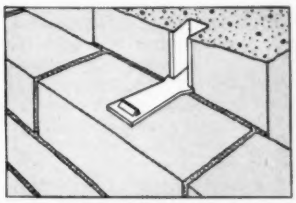
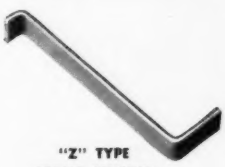


METAL
BRICK ANCHOR

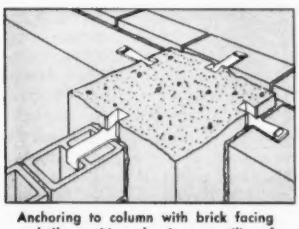


Anchoring Brick to Concrete

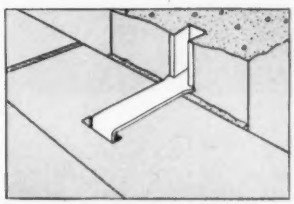


"Z" TYPE
STONE ANCHOR

STONE ANCHOR



Anchoring to column with brick facing and tile partition, showing versatility of Dovetail Anchor Slot and Anchors.



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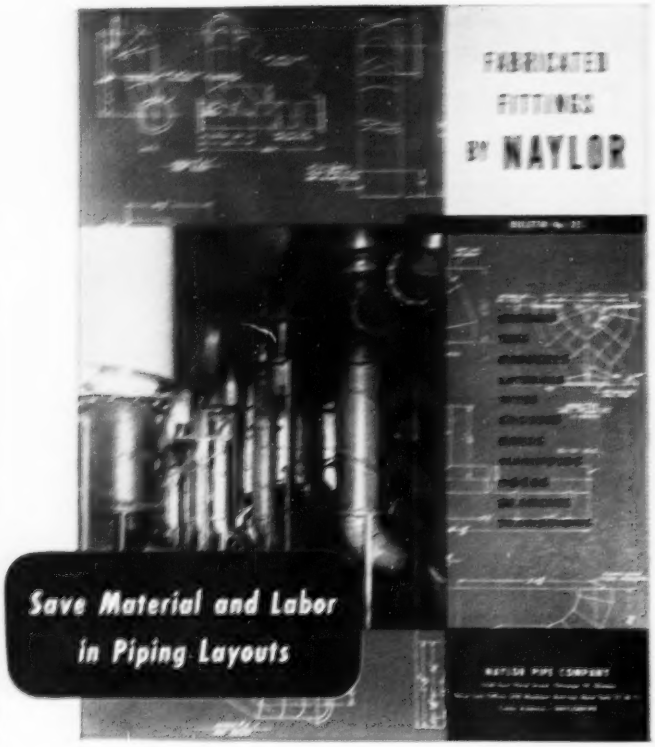

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armament, tanks, guns, munitions and other weapons of war could be produced in quantities sufficient to overwhelm the enemy. Camps had to be built before a bridge of ships and a seven-million man army could be mustered. Bases had to be constructed before attacks could be directed at the enemy.

It was necessary that this construction work be completed before many other parts of the war program could be undertaken. Because of this, construction was the first major industry to attain large scale defense and war production. By the time of Pearl Harbor it was converted 75 per cent to war work, and at one time there were more men mobilized on construction work for the Army than there were men in the Army.

Had construction failed in any part, other phases of the war effort would have been hampered, perhaps disastrously. But there were no bottlenecks in construction. The work was completed at unprecedented speed. The speed cost money, but in helping to speed the end of the war it saved lives.

As members of the armed services, construction men, with their methods and machinery, helped to develop the capacity for building airfields, docks, railroads, pipelines, and for moving millions of tons of supplies at speeds never before attained in military operation.

The nation's capacity to construct both at home and in combat areas was such that the wartime Chief of Army Engineers was able to report:

"By the war's end it was evident that American construction capacity was the one factor of American strength which our enemies most consistently underestimated. It was the one element of our strength for which they had no basis for comparison. They had seen nothing like it."

Should there be another war and the United States be subjected to bombings or other catastrophes, the construction industry will be immediately available to clear debris and restore essential facilities to use in the minimum time. There is no other way in which such work can be done except by the construction industry.

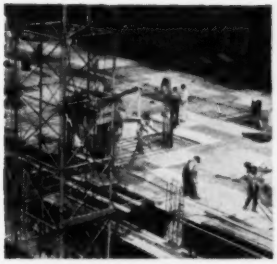
Connected With All Development

The subject of the development of the construction industry and the contract method is so vast that even a paper of this length gives but a sketchy introduction.

The construction industry through-

(Continued on page 70)

clean, smooth beams and piers of pre-stressed concrete



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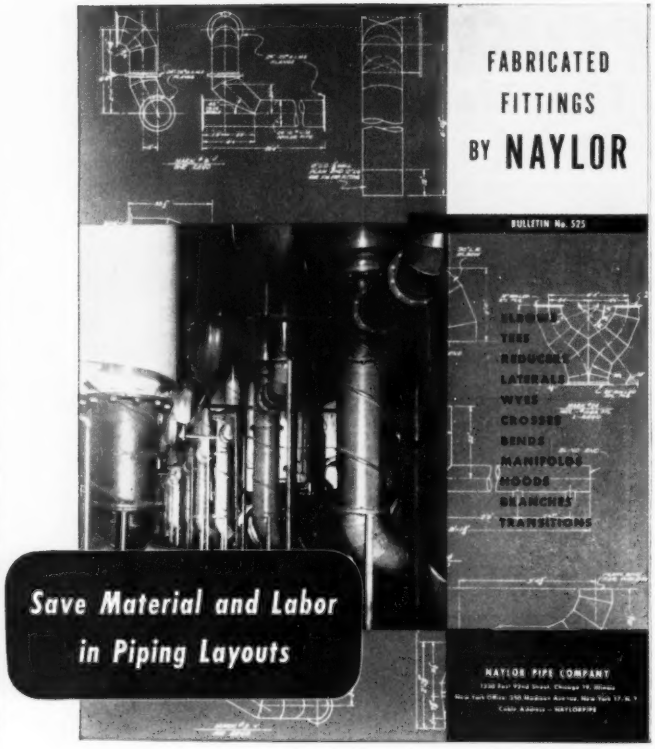

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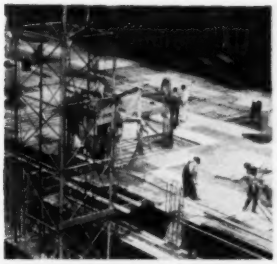

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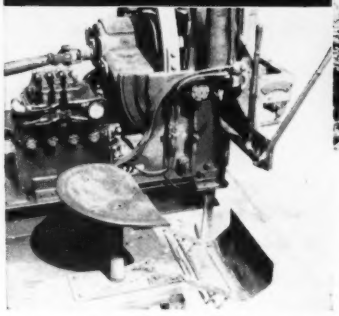

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INDUSTRY RELATIONS

(Continued from page 68)

out the history of the United States has had, still has, and always will have a tremendously important part in the development, growth and progress of the nation and its communities, and will serve as a medium through which investment can be made in facilities which serve people.

The construction industry has kept pace with and helped in the development of practically all other industries, and is able to make use of their discoveries to build constantly better facilities with greater speed and efficiency.

Labor has also kept pace with the development of new materials, new and greater designs. Workmen have had to be continually trained in new techniques while preserving their ancient skills. This has been done under a comprehensive program. American workmen have fully measured up to the challenge.

The industry is of huge size, and produces an amazing variety of products under every conceivable circumstance, yet its methods and internal organization have developed, often with growing pains, until they are of such flexibility that the industry can execute any structural need of the people any place in the world.

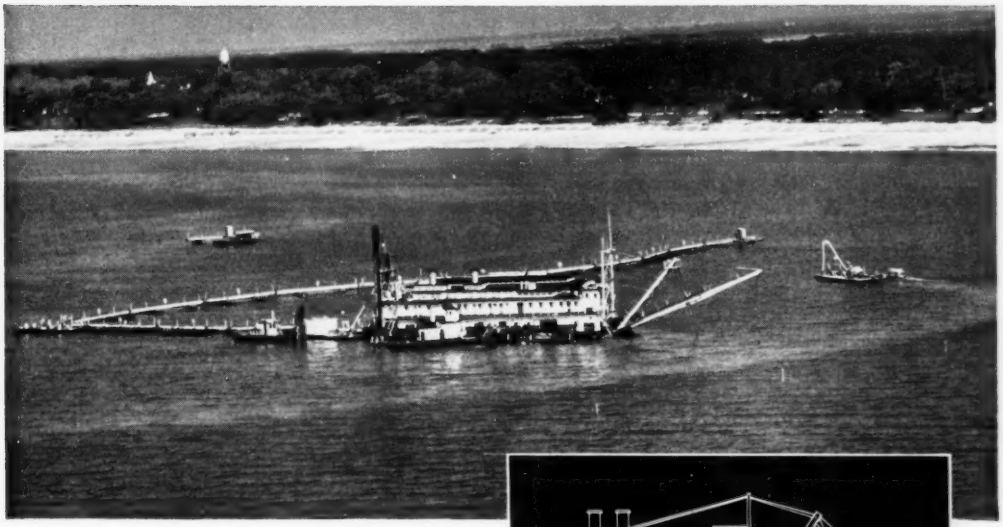
Joint-Cooperative Relations

By experimentation through the years and now by cooperation between such organizations as the American Society of Civil Engineers, the American Institute of Architects, The Associated General Contractors of America and many others, there has developed a type of joint-cooperative relationship within the construction industry which best fits its purpose, and which permits fair and equitable treatment of all those who are connected with construction operations.

As general contractors, who are the logical development in the industry to fulfill the need for organizations to take complete responsibility for the construction of projects and to correlate all of the skills, materials and machinery required, we look forward to an even greater century in partnership with engineers.

The engineer's qualities of skill, imagination and courage have been complemented by the initiative of the contractor in devising new methods and together they form a team which continues its advance toward an ever expanding vision of a greater United States of America.

What's U. S. Rubber doing to build the world's largest man-made beach?



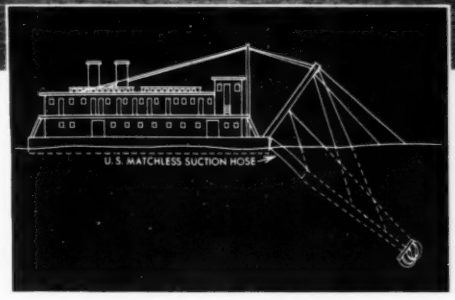


Photo shows dredge pumping sand to make the artificial beach on the Mississippi shore. It extends approximately 1500 feet into the stream. The diagram shows the cutter head which stirs up sand and silt. This in turn is drawn through the pipe, then through the U.S. Matchless Suction Hose to the pump and through the discharge line.

The dredge which has thus far sucked out over 6 million cubic yards of sand to build the 26-mile long beach from Henderson Point, Miss., to Biloxi, Miss., is equipped with U.S. Matchless® Hose. This tremendous job also includes the pumping of an additional 6 million cubic yards of river silt, sand and mud through this same hose. The sloping bathing beach, when finished, will also provide a defense for the sea wall in abnormally high tides. The "U.S." Hose, acting as a flexible connection between the cutter head and the dredge, is still in good condition and has plenty of service life left, despite its rugged treatment. No matter what your hose problem may be, consult United States Rubber Company.

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Construction—A Growing Field for the Civil Engineer

(Address Before Joint Session of A.S.C.E. Construction Division and A.G.C. Sept. 3 During the Centennial of Engineering in Chicago)

By Dwight W. Winkelman

Past President, The Associated General Contractors of America

» A 100TH ANNIVERSARY is a momentous event, especially if the organization has been as fruitful as the American Society of Civil Engineers has been since 1852.

In 1852, Franklin Pierce was elected president. I imagine that he rode to the inauguration over an old plank road. There were no superhighways. Other political figures that seem vaguely familiar to us from our American history textbooks were there, also. . . . U. S. Senators Stephen Douglas, Henry Clay, Calhoun and Webster. Baseball was just beginning to become popular in empty lots. There were no huge stadiums. In 1852, the most celebrated building was an imaginary one—"Uncle Tom's Cabin"—it was published that year. So was "Ten Nights in A Barroom."

That was the picture 100 years and four wars ago. It sounds like ancient history, doesn't it? It was in this era, I understand, that the American Society of Civil Engineers was formed. How appropriate that this association should come into existence on such a typical American scene!

Engineers Changed Picture

A century ago, most of the transcontinental railroads crossing our rivers and mountains were yet unbuilt. Our large bridges—the San Francisco Bay Bridge, the George Washington Bridge, and all the others—had not been constructed. The "Big Ditch" (the Panama Canal) had not been dug. There were no New York skyscrapers —no Boulder Dam.

In the 100 years since then, engineers with skill and patience and contractors with imagination and courage have changed the picture. That rare combination of qualities—reaching maturity under the free enterprise system —has produced highways and bridges, buildings, railroads and dams.

So, upon the 100th anniversary of the A.S.C.E., I want to add my congratulations to those already tendered and to acknowledge the productivity of the engineering profession over the past ten decades.

Today we are going to review the opportunities ahead for engineers in the construction field. I believe that such opportunities do exist. The America of 1952 is similar to the America of 1852 in that respect, at least. This is still the land of opportunity.

It is true, first of all, that the construction industry, like others, has more work than engineers to do it. The 5,500 civil engineering graduates of last spring were not enough to carry on the construction program this nation needs. There are apt to be more jobs than engineers for several years to come. As should be expected, their value has gone up. A joint cooperative committee of the A.S.C.E. and The Associated General Contractors of America is trying to encourage better salaries for civil engineers. This is a good time for the civil engineer to enter the construction field.

In addition to the usual demands for civil engineers in construction just now, I believe another consideration is encouraging. Contractors are, and have for some time now, been developing new respect for men of engineering education. The contractor of yesterday was often not an engineer, but a building mechanic with more business sense, courage and imagination than his fellow. He wanted to be independent. He wanted to pit his ingenuity against other free enterprisers and he often won out by sheer drive.

Partnership With Engineers

More than personal courage and initiative are required to keep a construction firm in the arena today. New products and new methods are coming onto the market daily. Contractors have learned to rely on their technical aides — the engineers — to keep the firm abreast of the progressive methods and shy of the impractical ones.

Notice how many contractors have invited engineers into partnership with them and how many are sending their sons (whom they expect to succeed them) through engineering schools.

Dwight W. Winkelman

Mr. Winkelman, president of the D. W. Winkelman Co., Inc., Syracuse, N. Y., was president of the A.G.C. in 1948. A native of Lohrville, Iowa, he attended Morningside College, graduated from the University of Iowa in 1924 with B.S. and A.B. degrees, then went into the construction business, establishing his own firm in 1927. The present company, which has been active in highway and heavy construction, was incorporated in 1934. He has served in important governmental and industrial capacities, and went on a mission to Europe to study German construction methods after World War II. He recently was awarded a D.Sc. degree by Morningside College.

The disciplined engineering mind has a contribution to make to the fierce, highly competitive constructon industry. The skilled training of the engineer has won the respect of general contractors.

Contractors have not only accepted the technical guidance of the engineer, but they would go further. Most contractors want their engineers to be able to shoulder other responsibility. They would like to see them absorb some of their own prerogatives—the ability to manage men and machines, schedule the job and acquire that cost-consciousness that makes or breaks businessmen.

They want their engineers to be more than draftsmen and designers. They want them to move into more responsible jobs. In that attitude lies new promise for young civil engineers.

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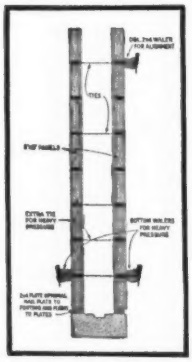

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managerial and general business matters in addition to having technical competence that distinguishes the professional man from the technician or craftsman." Today, engineers are assuming these greater responsibilities.

Construction Engineers Increasing

The statistics of your own organization bear this out. From 1933 to 1945 the construction division membership practically doubled, increasing from 2,700 to about 5,300. From 1945 to 1952, the division membership again more than doubled, reaching a total of more than 12,000.

For purposes of comparison it is of interest to give some figures for general society membership. From 1933 to 1945 the society membership increased from some 15,250 members to a total of 20,400, an increase of about 33 percent. From 1945 to 1951 it rose from 20,400 to 31,800, an increase of 55 percent.

In startling contrast to the increase in general society membership is the increase in the number of members engaged in contracting. From 1933 to 1945 this increase was only about 20 percent, whereas from 1945 to 1951, the number of A.S.C.E. members engaged in contracting increased by 320 percent, and now totals about 6,000.

Of this great boost in the number of engineer-members from construction, 40 percent are in the contracting field as owners, managers or corporate executives.

Again, note the number of contractor-engineers who have been active in the construction division through the years. W. J. Barney, J. P. H. Perry, Arthur S. Bent, A. P. Greensfelder, A. E. Horst, S. D. Bechtel, John W. Cowper, Adolph Ackermann, Charles Thompkins, Lester C. Rogers and many others. These men were engineers who became leaders in the contracting business and most of them have been officers of The Associated General Contractors of America. I repeat, the trend of engineers into command positions in the construction industry reveals that there are broadening horizons for the civil engineer.

Engineering Education Movement

Until recently, engineering education has lagged in the task of preparing young civil engineers for the construction field and the contracting business. In 1922, 30 years ago, there were being offered in our engineering schools only five courses in construction. Even ten years ago, there were only 72 such classes, although there were 45 different schools. Adolph Ackermann, chief of engineering for Dravo Corporation, wrote at that time that the schools were offering only "a smattering" of construction engineering.

That was the situation, even as late as 1942, although it has been estimated that 44 percent of all civil engineers are ultimately engaged in some phase of construction. Now, it appears, educators are recognizing that the construction industry is a field of opportunity for engineers.

There seems to be more emphasis, I believe, on construction courses in technical schools. They are offering more classes in building construction, methods and equipment, estimating and costs, contracting, labor relations, health and safety measures and job management. Even design engineers are being encouraged to become cost-conscious. L. E. Grinter, vice president of the Illinois Institute of Technology, wrote recently of this tendency.

"Believing as we do that only economical design is good design, we also emphasize costs to a greater extent than any other college except the College of Business." You would almost think they were training general contractors.

Industry Support

The industry is taking more than a passive interest in this trend. A few years ago, the Carolinas Branch of The Associated General Contractors of America raised a $100,000 endowment fund so that North Carolina State College could institute a curriculum leading to a degree in construction.

In many communities, other A.G.C. chapters collaborate with engineering schools to bring construction classes into being. Several chapters of this national construction association offer scholarships to promising engineers for additional study in construction. These are good moves and the industry will be better off because of them.

I have pointed out the new opportunities in construction for engineers —the engineer shortage just now, the reliance on engineering guidance by contractors and the unusual command positions open to engineers who can acquire business sense and the ability to direct men and machines.

There is another even more authentic reason to believe that the future for civil engineers in construction is bright. It is because the future for

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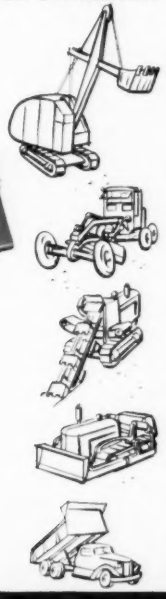

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construction itself is bright. Just before World War I, constructon volume in the U. S. was about $5 billion. Last year, it topped $39 billion to become the nation's largest single industry.

The A.S.C.E. was born in an age of virgin opportunities. A whole country lay before it relatively undeveloped. I want to repeat that we contractors will envision as fertile a future for our industry. There are needs today for construction that dwarf the needs of 1852. America is highly developed today, but it is going to be fantastically great tomorrow, we are told.

Look at the job ahead for builders:

According to the U. S. Public Health Service, we need at least 7,000 new waste treatment plants—over $1 billion worth of work.

According to the U. S. Office of Education, we will soon need 600,000 classrooms—about $15 billion worth of work.

According to the Corps of Engineers and Bureau of Reclamation, we need at least 80 new dams in the Pick-Sloan Plan alone—about $4½ billion worth of work.

President Truman has said we need atomic energy installations which would cost about $5 billion.

The Defense Electric Power Administration reports we will need to build power plants costing $12 billion in the next five years.

I won't attempt to predict the billions that will be spent by private industry for new plants, by states and cities for public works, or by the armed forces for a continuing defense program. But it is no wonder that the Bureau of Labor in its recent volume on employment opportunities calls the occupational outlook in the construction industry "decidedly good."

Uncertainties Ahead

It would be unfair to survey the long-range future of construction without recognizing the disconcerting possibilities of the next few years ahead. Peacetime construction has already been deterred temporarily, but only because a bigger job—the defense build-up—is necessary. There is no doubt that civil engineers distinguished themselves during World War II and can be depended upon to repeat, if necessary, what has since become known as an American miracle.

Speaking of that phase of our last war effort a few years ago, Chief of Engineers, Lt. Gen. Eugene Reybold reported, "By the war's end, it was evident that American construction capacity was the one factor of American strength which our enemies most consistently underestimated. It was the one element of our strength for which they had no basis for comparison. They had seen nothing like it."

If America faces such grave danger again, the need for civil engineers to repeat construction miracles will be greater than ever. Essential at all times, they will be doubly so then.

I have tried to describe the practical opportunities available to the civil engineer in construction work.

There are other, intangible rewards—of which we speak little but of which we are all aware. There is more than the weekly checks and the professional advancements in store here. There is the satisfaction of seeing ambitious plans turned into ribbons of concrete highway, tall buildings, solid dams, long, beautiful bridges. In these achievements the engineer finds himself in a key position. He sees the rough, undeveloped site and the attractive finished product and knows that he is instrumental in that transformation. He finds new challenges in each project and discovers the joy of cracking hard problems.

It is to these rewards also, that the construction industry invites the civil engineer.

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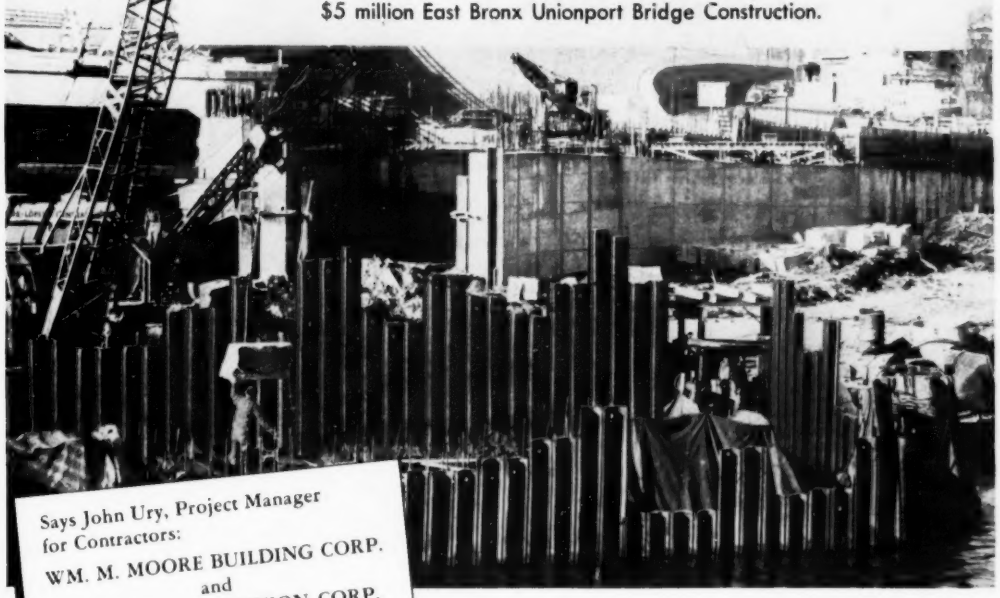

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Labor-Management Problems in the Construction Industry

(Address Before Joint Session of A.S.C.E. Construction Division and A.G.C. Sept. 3 During the Centennial of Engineering in Chicago)

By L. C. Rogers

President, Bates & Rogers Construction Corporation, Chicago, Illinois

» MORE THAN a century ago, when my father's grandfather started the construction of the first lighthouse for the budding lake port 80 miles north of us—now the thriving city of Milwaukee—that hyphenated term "labor-management relations" had never been thought of, much less heard, in the sparsely settled and booming area of the northwest.

Doubtless, great-grandfather Jake simply picked out a few of his neighbors whom he knew were skilled with the saw and square, or the stonecutter's tools, or the number-two shovel, made a deal with them, and all went to work to build a lighthouse. "Jurisdictional disputes," another unheard of phrase and unknown problem were settled before they arose by great-grandfather's assignment of the tasks each man was to do.

Close and sound relationships between management and labor in the construction industry have always been essential. Construction, except in a very few limited areas, is not in any way a line-production or factory process where the artisan performs exactly the same task day after day after day.

Therefore in this field, whether in a small concern or a large one, reliance must be placed at all times on the ability of the individual craftsman and the foreman to make quick decisions with good judgment in all sorts of constantly developing emergencies ranging from minor matters to crucial dangers.

The crane operator swinging large loads in a high wind, the steel gang setting and fastening the framework of bridge or building high above the ground, the sandhogs burrowing away below the surface in water and muck held back only by the pressure of compressed air and the know-how of the men, the tractor operator "dozing" a trail along the edge of the cliff, the carpenter throwing in bracing when rain-softened earth loses its stability —all these men together, and each of them separately, have in their own hands in large measure the ability to make a success or a failure of that particular contract. Thus mutual respect, good relations, and above all, intelligent understanding between management and labor in construction are of the greatest importance.

In the early years of this country's history the relation of manager to labor was in large degree that of a supposedly benevolent despot with a paternalistic interest in his workman covering both his trade and morals.

The carpenter apprentice was bound out in his middle teens for a five year period to learn from his master "the art, trade, or mystery of house carpentry."

While he was absorbing the "mysteries" of his trade, the young man was prevented by the terms of his indenture from playing cards, dice or any other "unlawful" game. Ale houses, taverns and gaming places were not to be frequented. Nor was the apprentice to marry during the period of his indenture. And to quote: "Nor shall he commit any acts of vice or immorality which are forbidden by the Laws of the Commonwealth; but in all things, and at all times, he shall carry and behave himself towards his said Master, and all others, as a good and faithful Apprentice ought to do."

In return for this exemplary conduct, the master contracted to teach the apprentice as long as he could learn, and to provide him with suitable clothing, board and lodging, two washings per day, three months of schooling in evenings of the winter months, and a set of carpenter tools when he completed his indenture.

But the men who had risked so much to come to the shores of this new continent were independent souls who believed in the inherent worth and dignity of the individual and who wanted freedom from domination whether paternalistic or tyrannical.

Faint stirrings of opposition to the authority of the contractor appeared in attempts of the master carpenters in Philadelphia to organize for the purpose of fixing wages and enforcing a closed shop, even before the Declaration of Independence was written.

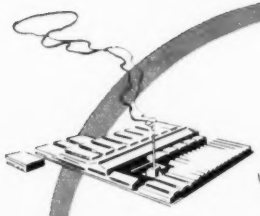
Lester C. Rogers

Mr. Rogers, currently vice chairman of the A.G.C. Labor Committee, and its former chairman, has been active in labor relations for many years, and is a national A.G.C. director. Starting with his firm in 1910 as water boy, he became president in 1937 of the company which is known for its major heavy projects, including work for most of the railroads in the United States. He received a civil engineering degree from the University of Wisconsin in 1915, is a member of the A.S.C.E. and other professional, civic and educational groups.

In 1802, the carpenters of Savannah, Georgia, petitioned the legislature to incorporate them into a union so that they would have "equal, level and recognized social footing with others."

A few decades later as the nation grew, men of great courage and skill were pioneering with the same spirit of independence in the development of an industrial establishment which was to make the United States unique among the nations of the world. These giants of industry and finance believed completely in free enterprise and in their own individual freedom to follow whatever course of action in their judgment would bring financial success. The only "social security" they wanted was that which came by the sweat of their brow, the hardness of their nerve and the skill of their hands and brains.

In their drive for success many of them were ruthless in their tactics with the public, with their competitors and most important with their own labor. Decency, fair dealing and



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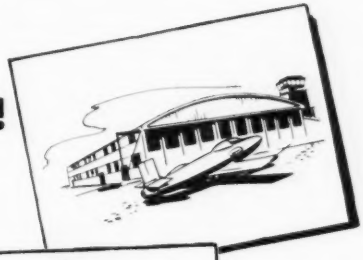

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human rights were frequently brushed aside in the mistaken idea that men who worked with their hands were made of clay inferior to that of the manager. Many an owner believed that the great financial risks which he took could legitimately be passed on to and squeezed out of labor, for after all, had he not developed the jobs which the men held.

The changing atmosphere of this young country from that of agriculture to urban industrialism, brought about a more complicated and of necessity, a more highly organized society. The limitations of urban life brought problems in unemployment. The craftsman out of a job could not go back to working his few acres or find a place on his neighbor's farm as he could in the smaller agricultural communities. He was forced to rely on his own meager savings or on charity probably grudgingly given. His pride was injured and his sense of justice aggrieved.

Belief in man's individual freedom and constitutional rights was not the sole property of owners or management. With the many developments and changes in the social and economic structure of the nation, champions of the workingman arose to challenge industrial might and to claim rights for labor.

Thus, even while great-grandfather and his neighbors were setting the masonry for the lighthouse in the free, country atmosphere around the little lake village of Milwaukee, the pressures of city life and the effects of the early stages of the industrial revolution were starting a pattern in seacoast cities such as Boston, New York and Philadelphia, that would in time cover most of the nation.

The large construction labor unions as we now know them came into being largely in the last quarter of the nineteenth century and followed the English pattern of organization by craft. In 1881 they banded together to form the American Federation of Labor. A year later Samuel Gompers was elected president of this federation. No more useful mental exercise and philosophical study and no more practical wisdom could be recommended to the leaders of labor today than that they study carefully and often the tenets of labor union policy of Samuel Gompers, especially with reference to labor's position in the political arena.

The growth of the unions was a slow and painful one for many years, fraught with violence, lawlessness and bloodshed. Fearless and reckless men on both sides spurred on the battle, each group firm in the belief that its rights and its freedoms were being jeopardized and usurped.

The mushroom development of the unions occurred of course, with the depression and the advent of the New Deal with its drive for voting power and its unscrupulous and dangerous pitting of class against class. Although the New Deal worked most closely with the leftish mass unions, the pace set by these mass unions and the pressures developed thereby in the rank and file of all workers, forced the leaders of the more conservative craft unions to fall in line so as not to lose their leadership to more radical factions.

Furthermore, under the New Deal, the Federal Government became the chief buyer of construction through direct contracts by its various agencies and through subsidies to the states. Since the New Deal was determined to advance unionism, the Federal Government stipulated in its contracts and subsidies that the wage regulations and job requirements should be the union wages and union regulations of the areas. The pendulum of power had now swung far in the opposite direction from the days of the eighteen nineties.

Some contractors do not employ union labor, but the great bulk of those who work in and around the large centers of population and those who handle large public works contracts at first were forced to, and now in many cases do use union labor preponderantly.

Every major economic and social trend, such as the growth in strength and numbers of unions, has both good and bad features. Mainly in the early days, the growth of the unions tended to improve the standard of living of the working population. To many contractors the existence of a pool of craftsmen assembled and available through union offices in the larger cities has been a decided advantage. Furthermore, while there always have been and always will be many irritations and dissatisfactions in dealing with and working through union organizations, it probably can be said that these same irritations and union demands for high wages have had some tendency to make construction management more efficient and more resourceful in an effort to keep costs within a competitive range in the face of high labor rates and expensive working rules.

On the other hand, there are serious defects in the situation. There is no need to outline the unfortunate aspects of the alleged domination of the individual and his output in some areas, nor to point out the economic waste from feather-bedding rules of which some trades are accused. The fact that each international union is a collection of autonomous locals often makes it difficult for the international to maintain discipline in all locations.

By far the worst problem which has arisen to plague the owner, the contractor and the unions as well is the problem of jurisdictional disputes. These result from technological developments, the introduction of new materials, new methods, new machinery and similarity of job types, combined with the not unnatural struggle by union officials and their unions to seize every class of work which by any stretch of the imagination they can argue should be handled by their particular craft. For example untold thousands of dollars were lost 30 years ago by workers, contractors and owners over the question of whether sheet metal workers, ironworkers or carpenters should place the then new metal trim and corner beads which were being substituted for wood.

The recent use of steel mesh in walls as a backing for plaster and in floors as a support and reinforcement for concrete, brings the lathers and the ironworkers into conflict. What shall govern, the nature of the material or the use to which it is put?

Carpenters and laborers fought long over the right to strip forms from concrete work. The struggle between the electrical workers and the ironworkers for the erection of steel transmission towers over many miles of new power line construction has been a bitter one.

Craft Unions Endangered

These disputes, because of the size and power of the various international unions which are involved, become a battle of giants which not only consume the time and the capital of the owner and the contractor but take many pay checks from the pockets of the craftsmen, who can least spare the money. Also, with the growth of the C.I.O. unions containing construction maintenance crews ready to perform without inter-union disputes, these jurisdictional battles are endangering the very future of the craft unions.

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The actual jurisdictional rights of the 19 international unions in the construction field are the result of the initial grant by the American Federation of Labor itself, made when each union joined the federation, plus various interpretations which have been agreed upon from time to time by two or more unions as questions arose. These rights are held sacred by the individual unions.

In the years gone by, the settlement of jurisdictional disputes was considered by the unions to be entirely within their own purview. All efforts by contractors or owners to take part in jurisdictional settlements were refused, except in three localities. The Building and Construction Trades Department of the American Federation of Labor attempted to work out settlements on its own through a national board which it had established, and later by "spot decisions," or one-job decisions, by the president of the Building and Construction Trades Department.

However, the American Federation of Labor is organized so that each international union is a sovereign power, and in forming the Building and Construction Trades Department within the federation, the 19 international unions involved granted to the department only certain limited authority. This same situation holds true with the over-all authority of the American Federation of Labor itself.

Therefore the necessary power to enforce jurisdictional decisions which had been or might have been made, simply did not exist. For this reason and because of the constant interplay of the great forces of internal politics among the unions, decisions were delayed and sidestepped with great frequency. The matter seemed almost impossible of solution.

It has frequently been proposed that the easy solution of this unsatisfactory condition is to turn to the non-craft, C.I.O. type of organization, but this involves the probable loss of valuable features of the existing status. For example, there is a pride of craftsmanship developed in apprentice training and from experience through the years.

Reliance on Craftsman

It may be argued that such pride no longer motivates the craftsman but unbiased examination will show that it does exist, that it is worth while and that it should be encouraged and developed rather than discarded. As we have already pointed out, reliance on the craftsman in construction, his skill, experience and integrity, is a fundamental necessity.

In the past, in only three cities, Boston, New York and Chicago, have the international unions recognized local settlements of jurisdictional disputes by local boards composed of union and contractor representatives as binding upon the local and international unions. The local boards in these cities have handled the problem with great skill for many years and have never conflicted with the national decisions made previously.

The great swing of the pendulum from the side of the giants of industry at the end of the nineteenth century to the side of the giants of labor unions within the last two decades brought with it the same opportunities and the same tendencies for abuse of power. The American citizen though, still can and does rebel against undue concentration or misuse of power in any segment of society.

In an attempt to control the situation in 1947, Congress passed the Labor Management Relations Act, usually known as the Taft-Hartley Act. This law defined unfair labor practices in such a way that it became a necessity for labor and advisable for management to join together in an attempt to solve the problem of jurisdictional disputes.

Joint Board Established

The law made it an unfair labor practice in a jurisdictional dispute involving a contractor and two unions, for any two of the parties to the dispute to decide the assignment of the work in question. Such action in effect would coerce the third member either into doing the work or not doing it and such coercion is illegal. To assign work legally, prior agreement is necessary between all parties that each and all would be bound by any decision mutually decided upon.

Thus the industry and the unions it might be said, by a process of artificial insemination conceived, and after two years of severe and protracted labor pains, brought forth the National Joint Board for Settlement of Jurisdictional Disputes. The joint board is composed of representatives of construction employers and labor working under an impartial chairman chosen by the two groups. Although the joint board has no legal authority in itself, the National Labor Relations Board recognizes the special competence of the joint board in settling jurisdictional matters and would doubtless confirm its decisions in the great majority of cases, were an aggrieved disputant to carry the case to the top board.

The bible of the joint board is the so-called "Green Book" which contains, (1) a complete copy of the agreement between all three groups which established the joint board, namely the Building and Construction Trades Department, The Associated General Contractors of America and the participating Specialty Contractors Employers' Association; (2) a copy of the procedural regulations governing its operation, and (3) a copy of all prior written agreements between unions on various jurisdictional cases.

Because of the terms of the Taft-Hartley Law, all participants using the services of the joint board must sign stipulations agreeing to accept and be bound by the board's decisions. These stipulations were signed for the unions by the president of the Building and Construction Trades Department with the intent of binding its 19 constituent unions. Since the various specialty contractors have traditionally worked on a union basis, their employers' association representatives signed for their entire membership.

In the case of the general contractors represented by The Associated General Contractors of America, the situation is different. The agreement establishing the board specifically binds only those contractors employing members of the unions affiliated with the Building and Construction Trades Department. Therefore, because the labor practices of general contractors range all the way from completely open shop operators to completely unionized operators, each individual general contractor who comes within the requirements of the agreement must sign his own individual stipulation.

When a dispute arises with all factions signed up, the general contractor is given the authority to assign the disputed work to the men who are entitled to it under decisions and agreements in the "Green Book," or in their absence, according to the usual practice in that particular area. The contractor and the unions must continue to work on this basis while the case is being presented to the joint board. When a decision has been made by the board itself or by the parties under pressure from the joint board,

the work is then assigned in accordance with the decision.

If all contractors and unions with jurisdictional disputes would follow through on all phases of this carefully formulated and agreed-upon plan, the plague of lost time from jurisdictional disputes would be at an end. Of course such perfection is to be hoped for, but is seldom achieved. In some instances contractors have failed to assign work in accordance with the correct area practice. In other cases contractors have closed down their work through a mistaken idea of their duty or because of bad feeling. In many cases one union or both unions have walked off the job, sometimes deliberately and sometimes because of lack of control of the local by the international.

Although there have been many defections of this sort, most of them have been minor in the loss of time involved and they can be overcome to a large degree by better education of both parties as to their rights and duties and by greater integrity and discipline on the part of the signatories with regard to the moral and practical value of their written word.

Decisions Must Be Accepted

There has been one instance of a serious defection from the signed agreement. One group of specialty contractors and the union which they employ gave notice of their intention to withdraw from the plan because of a decision unfavorable to this union. This is one of the 19 unions supposedly bound by the stipulation signed by the president of the Building and Construction Trades Department. It is self-evident that every decision by the joint board must militate against one or more of the parties involved. There must be sufficient moral integrity in the parties to accept adverse decisions when they come if the plan is to succeed.

A withdrawal from the signed pledge such as has been described poses many complications and endangers the rights of construction employers and unions who are faithful to their agreement. Architects and engineers, as well as owners, can take action to prevent similar defections by means to be suggested later.

The joint board actually has been very effective in reducing the lost time and attendant costs of jurisdictional disputes. It has handled in the four years of its life, some 1,500 cases involving work stoppages and many times that number where no stoppage of work was involved. The board has processed these cases largely by encouraging settlements mutually developed by the parties without resort to expensive legal procedures, except in a very minor number of instances. Perhaps one of its major contributions has been the development of a sound and workable method for the orderly settlement of jurisdictional disputes, one of the fundamental needs in the construction industry. It also has been instrumental in bringing about final settlement and agreement on a national scale of several of the most difficult and long-standing disputes between certain trades.

Owners, and more important, their advisors the architects and engineers, can assist in the excellent work of the board and can aid those unions and contractors who are earnestly and honestly endeavoring to reduce the cost and incidence of jurisdictional disputes.

Most jurisdictional problems arise in highly specialized fields of work, especially in construction of buildings. When the architect or engineer draws his specifications for the specialty phases of his project such as the heating, plumbing and electrical work, he in effect, sets the pattern under which the subcontractors will attempt to work.

It is not to be expected that the consulting engineer can be aware of all the changes, agreements and customs with regard to union jurisdictions in many geographical areas into which his design work takes him. But if he were to consult with local trade association representatives or experienced contractors in the region before he published his specifications, he might well avoid inadvertent invitations to jurisdictional trouble.

Then, as a very significant step, it is suggested that architects and engineers in drawing contracts and specifications, include a clause in their contracts requiring each and every general contractor and each and every sub-contractor to sign an agreement to come under the Joint Board for the Settlement of Jurisdictional Disputes and to be bound by its findings. This would benefit owners by greatly reducing the likelihood of costly jurisdictional delays. At the same time this requirement would protect both contractors and unions who are seriously trying to make the plan work. It is to be hoped that such a clause

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might become standard practice in building contracts.

These suggestions are not partisan in any sense of the word, but as a matter of fact serve the best interests of everyone, the owners, the architects, the engineers, construction management and the labor unions alike. The Washington staff of The Associated General Contractors of America, the chapter secretaries or any contractor will be happy to furnish all possible necessary and pertinent data in connection with this suggested advance in which we as engineers, architects and contractors can cooperate.

Responsible union leaders recognize the value of good contractor-union relationships in promoting steady work and they recognize the serious threat of jurisdictional strikes to their unions and to the construction industry. Only two months ago the 19 general presidents of the international unions affiliated with the building trades department, passed a resolution banning picket lines in the case of jurisdictional disputes. This is a definite step forward in preventing work stoppage.

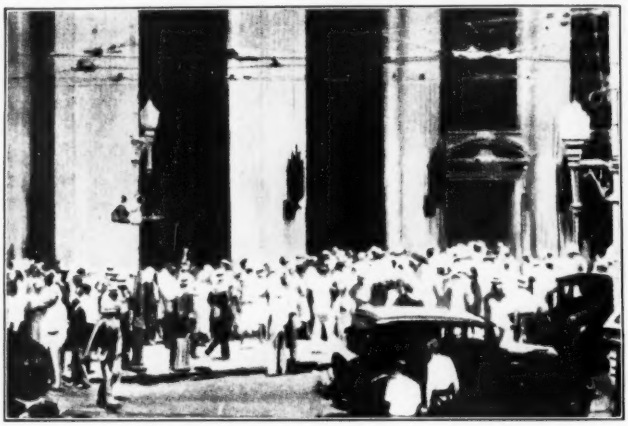
Slowly but with increasing certainty the unions are coming to realize the responsibility and the dangers inherent in having practically a monopoly of the labor supply. Although their paths seem at times to diverge considerably, there is no question but that the ultimate aims of both the contractors and the top craft-union leadership in the building trades coincide in a mutual desire for a stable, profitable construction industry.

There are hopeful and constructive signs. Both labor and management are constantly working towards more understanding. We need to be rid of control boards which stimulate wage and price increases instead of stabilizing them. We need to be free of governmental and political interference in the guise of so-called "emergencies." Then once again, full responsibility can be placed upon the unions to put their own houses in order. Contractors and the unions will be free to bargain together without government interference and increasing good can result.

Union leaders need to recognize that living standards are only raised, in the last analysis, by increased production; to recognize the inherent dangers to their own cause in a labor government, and to recognize the need for and the value to labor of maintaining a strong, competitive free enterprise.

Construction management and engineers in public bodies and industrial organizations need to be realistic in their assessment of the place of the unions in our present society and to realize the forces which frequently coerce union leadership to make decisions and take actions which seem to be against the public interest.

That phase of human relationships which involves the contacts and the contracts between management and labor will always be an intriguing, baffling and most important problem for the responsible top leaders in labor, engineering and construction. It is an ever-present problem for which there can be no permanent solution. If approached with integrity, good will and a desire for real understanding, it is a rewarding and profitable study and will doubtless reappear as a subject for the agenda of the second centennial of engineering.



THE DEPRESSION ERA
of the EARLY 1930's

Corporate suretyship more than proved its worth when it survived the depression period of the early 1930's. Business fell off alarmingly, security prices continued to sink, unemployment rose, breadlines lengthened and bank failures added to the general distress. The result was inevitable and on March 5, 1933, all the banks of the country closed. A week later the sounder ones reopened under Government licenses and the last critical phase of the depression had ended.

By every standard of economic behavior, a substantial number of the fidelity-surety companies in the United States could have gone down in the welter of depression, defeatism and collapse. The manner in which they withstood the drastic changes of the hectic '30's was one of the most remarkable feats in their brief but eventful history and a dramatic evidence of sound planning, far-sightedness and initiative on the part of management.

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Navy Trains Its Own Postwar Seabees To Replace Old Wartime "Ready Mades"

» THE READY-MADE SEABEE of World War II has been replaced by a tailor-made boot of today.

And the U. S. Naval Construction Battalion Center, Port Hueneme, Calif., the Seabees' school, is literally a teeming hive of activity as the men, fresh out of boot training and with little if any construction experience, set about to "Learn by Doing."

When the Seabee battalions were organized at the start of the war, the men were taken from their civilian jobs and made petty officers overnight. Rates were handed to them on the basis of their civilian jobs, since the Navy had no schools which issued such rates to regular naval personnel. At the end of the war, the men returned to their civilian work.

Established in 1945

In 1945 the Navy recognized the need for peacetime Seabees and established this school at Port Hueneme. The program there was designed to teach the men the basic principles of the construction trades. Motto of the school is "Learn by Doing."

Today, instruction courses include apprentice training for drivers, construction electrician mates, steelworkers, utilities men, builders, surveyors and draftsmen.

For experienced personnel, classes are conducted in all of the schools except surveying. Primary courses last 13 weeks and the advanced classes 15 weeks. In keeping with the motto, no more than 25% of instruction is devoted to the class room, the rest of the time being spent gaining practical training in the field.

Beginners start off in the center's driver schools, where basic training is given in the operation and preventive maintenance of trucks, crawler tractors with attachments, clam shells, carry-all scrapers, cranes, graders and well-drilling rigs.

During the course, one week is spent on each type of equipment. Classes are scheduled so that there is a carry-over of learning from the last training operation to subsequent ones.

Students Assigned Equipment

Equipment is assigned to students at the beginning of each week and they are responsible to clean, lubricate, and make field adjustments and repairs under the supervision of instructors.

After this, the students move up to a two-week course with dump trucks and truck tractors towing semi-trailers. At the end of the course the qualifying drivers are given government operators' permits.

Next comes an indoctrination period of safety procedures, hand signals and operating practices followed by a 3-week class in crane operation. The men begin by manipulating the controls, lifting light loads, followed by a week of clam shell work and finally a week of heavy hoisting into blind areas, guided only by hand signals.

A month of earth-moving instructions follows with the first week devoted to lectures and the last three devoted to work with bulldozers, carry-all scrapers and motor graders. By this time the men can construct an earth-fill dam or road.

Because of the Seabees' high standards, graduates of the basic drivers' course are not yet considered equipment operators. The men still have to get more actual experience under working conditions.

Class supervisors, who likewise have been attending advanced courses paralleling the basic ones, are now ready to teach these "tailor-mades" to become competent operators.

At the annual Joint Conference of State Apprenticeship Agencies held in Washington Aug. 20-22, representatives from 28 states, the District of Columbia, Hawaii and Puerto Rico met to study the status of apprenticeship in the nation and how to increase training programs.

Sponsored by the Bureau of Apprenticeship, the meeting considered specifically the deferment of apprentices and the progress being made in major industries, including the building trades.

Students learn to lift weights and handle cargo at Port Hueneme

Draft Deferment Rules

Complying with a Presidential directive deferring apprentices subject to the draft, the Bureau of Apprenticeship is aiding sponsors who wish to have their programs certified for the deferment benefits.

W. F. Patterson, director of the bureau, announced recently that facilities in the agency's field offices will be made available to help individuals process requests for certification. Mr. Patterson said that the order will "not only maintain and increase the ranks of skilled workers needed in our extensive defense program, but (also will) maintain a sound civilian economy."

Apply to State Directors

Sponsors must make applications to their respective state directors of selective service, certifying that their programs conform to all the requirements and standards governing the deferment order, he said. The draft boards, however, will have the final authority over deferment, since they have draft quotas to meet.

Necessary forms for requesting acceptance of apprentice training programs, and for assistance in processing requests can be obtained from field representatives of the bureau, representatives of state apprenticeship agencies or from state directors of selective service.

Standards for Eligibility

An apprentice training program, to be considered eligible under the order, must have been in existence at least one year, must have employed one or more apprentices continuously during this time in each occupation for which the request is made, and the occupations considered must conform to requirements for apprenticable occupations prescribed in the order, he pointed out.

Also, the sponsor must show that each apprentice for whom deferment is requested is meeting the standards and requirements of the training program, and that he has completed the required number of hours of on-the-job training and related instruction.

Apprentices in occupations considered "critical" by the Labor Department must have completed 1,000 hours of training in order to be deferred from the draft. Other apprentices must have completed 2,000 hours.

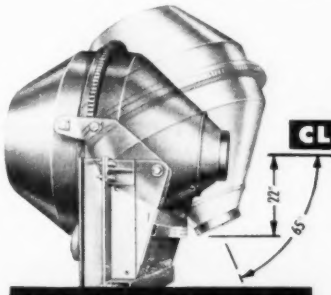
Apprentice Trainees Decline 3% in First Quarter

The number of active apprentice trainees in the first quarter of 1952 decreased 2,500 from over the previous quarter. Nine of the twelve trades surveyed showed a decline with only three registering slight increases.

Trades showing an increase were as follows: roofer and slater, 407 to 518; structural iron worker, 720 to 854; and construction electricians, 11,351 to 11,410, the Bureau of Apprentice Training reported.

Out of the 681 carpenter suspensions, 431 were suspended in Georgia for non-military reasons.

Trade	Active Dec. '51	New Men	Completions	Cancellations	Suspensions	Active March '52
Brick, Stone	7,504	625	512	201	172	7,244
Carpenter	23,213	1,224	782	1,372	681	21,602
Cement Mason	656	54	54	19	13	624
Painter	3,861	229	144	219	36	3,691
Plasterer	2,923	173	190	68	36	2,802
Plumber	16,511	1,026	709	416	121	16,291
Roofer, Slater	407	156	7	37	1	518
Glazier	609	37	34	17	4	591
Sheet Metal	7,207	653	504	312	138	6,906
Struct. Iron	720	226	22	64	6	854
Electrician	11,351	1,336	705	426	146	11,410
Construction	2,784	171	163	98	20	2,674
Totals	77,746	5,910	3,826	3,249	1,374	75,207



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Canadian Apprentice Drives

A national association representing construction interests in Canada, recognizing the need for more apprentice training programs in the dominion, has planned two programs among the industry's leaders and the general public to improve the situation.

At its 34th annual convention in Toronto, the Canadian Construction Association passed two resolutions outlining the part it would play in educating the industry and public to the need for more such training programs.

Resolving to correct this condition "with all the vigor and realism at its command," the convention voted to sponsor groups of employers in meetings on municipal, provincial and national levels, from which it was hoped would come a new approach to a broader system capable of satisfying all persons concerned.

Publicity Campaigns Planned

It also called for a campaign to be financed by the association, that would seek out important employers in various Canadian cities with a view to winning their direct and active support in the program.

Stating that postwar Canadian construction has outdistanced the apprentice training program, the association resolved to conduct publicity campaigns throughout the country for a larger and better training program in building trades.

Two of the chief reasons cited for the slack-off in training programs were a lack of employer participation and the restrictions concerning proper journeymen-apprentice ratios on jobs.

The convention also suggested that there should be more pre-employment training which would result in a shorter period of apprenticeship, and at the same time provide the employer with an apprentice who has a "fair degree of trade skill."

General contractors and subcontractors also were asked to provide job-site training to apprentices and to administer the journeymen-apprentice ratio on a regional level instead of on an individual or job basis.

Finally, the association asked authorities to organize full-time pre-employment instruction for building trades apprentices as well as night class refresher courses.

Latins Study U.S. Methods

More than 100 Latin American vocational school instructors studied American methods of apprentice training at a 5-week seminar conducted recently at the University of Maryland.

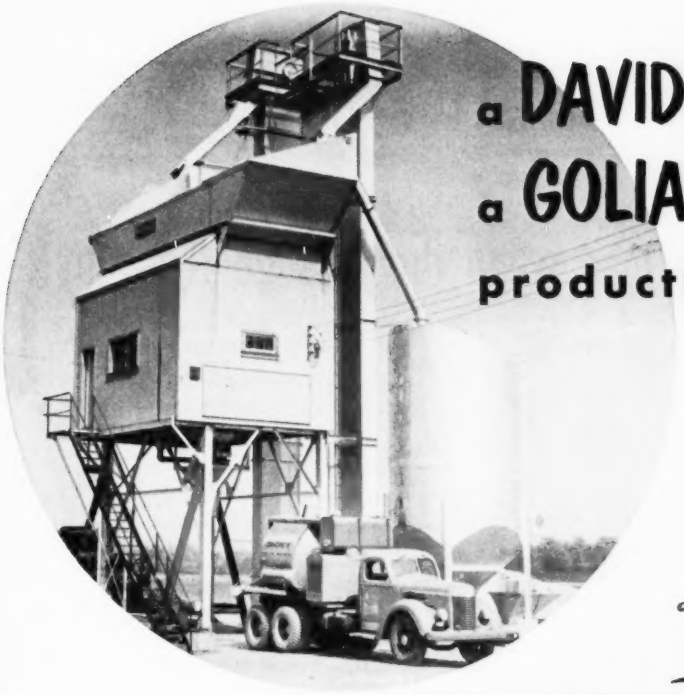
The seminar, sponsored by the university, the Institute of American Affairs, the International Labor Organization and the Pan American Union began Aug. 2 and concluded Sept. 6. The purpose of the gathering was to familiarize the instructors with the U. S. way of training apprentices.

States Control Schools

Most of the Latin Americans were unfamiliar with this country's joint labor-management programs to train workers. Down there trainees attend state-controlled vocational schools which teach students the arts of the trades. As a result, there is not much chance for the apprentice to receive on-the-job training as does his counterpart in this country.

At a recent panel meeting of the seminar, Welton A. Snow, manager of the Building Contractors' Division of The Associated General Contractors of America, representing management, explained the part contractors play in apprentice training. At the same time, Assistant U. S. Commissioner of Education Dr. Joseph Strobel discussed on-the-job training and related school instruction.

Language differences were no barrier, as there were many interpreters to translate the questions and answers spoken in four languages—English, French, Spanish and Portuguese. Members present received their translations over individual earphones, giving the seminar the atmosphere of a United Nations' session.



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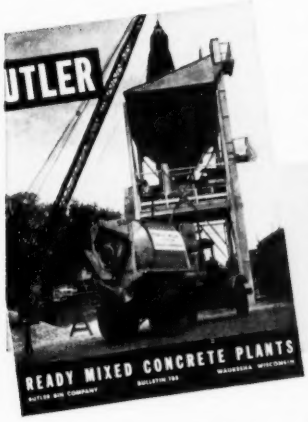

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Memphis Builders Push Cooperation Idea

• Industry Committee Strives to Erase Costly Friction on Jobs

» A MEMPHIS, TENN., committee of general contractors, architects, subcontractors and material producers is strengthening industry relations by a common assault on their problems.

Feeling that misunderstandings and lack of cooperation on mutual affairs was costing the industry a great deal of money and good will, the local construction industry's advisory council launched the committee to attack those ills. The Memphis Chapter of The Associated General Contractors of America was instrumental in the formation of the group.

The A.G.C. chapter submitted this list of actions which the committee might support in the interests of smoother inter-industry relations. It is typical of the problems the four-party group is tackling.

Architects

1. Prepare sufficient number of plans and specifications.
2. Define clearer separation and responsibility in specifications of all work divisions.
3. Study larger spaces and best locations for mechanical and electrical equipment and piping.
4. Adhere closely to A.I.A. Contract on monthly estimate payment time.
5. Ascertain and acquaint bidders of the owner's financial responsibility and arrangements.
6. Approve promptly shop drawings and details submitted.

General Contractors

1. Maintain better housekeeping on the job.
2. Cooperate closely with subcontractors and material furnishers on starting work, deliveries, protection to each other's work, and proper storage facilities.
3. Negotiate as a group on definite rules for furnishing all temporary facilities, such as telephone and hoisting.
4. Adhere closely to A.I.A. Contract regarding prompt payments to subcontractors and material furnishers.
5. Arrange job meetings of all subs and furnishers.
6. Make up work schedule and advise all subs and furnishers accordingly. Send copy to architect.

Subcontractors and furnishers

1. Submit promptly shop and detail drawings and samples.
2. Keep closer contact with field work and general superintendent for proper starting time on subwork and material deliveries to prevent damage to work of others, and for cleaning up.
3. Secure temporary approval when subcontractors' work is practically completed and also prompt and careful attention to architect and owner's punch list at final job inspection.

Texas A.G.C. Council Meets

Texas chapters of The Associated General Contractors of America discussed labor problems, safety methods and legislation at their Executives' Council meeting early last month in Abilene.

Host of the 2-day session, Aug. 3-4, was the recently organized West Texas Chapter, made up of 35 contractors operating in 81 counties.

On Sunday, the first day of the meeting, the labor relations committee met under the direction of Oscar Rose, Abilene, its chairman. Following later in the day was a welcoming dinner and informal discussion at the Abilene Country Club where some problems were aired.

The next day the council, with members from 40 cities, met formally under the chairmanship of its president, F. S. Oldt, and approved the report of the labor committee, discussed accident prevention, national legislation and voted to hold the next quarterly meeting in Dallas.

Ten Chapters Represented

Represented at the Monday meeting were chapters from Amarillo, Abilene, Dallas, Fort Worth, San Antonio, Austin, Corpus Christi, Beaumont, Harlingen and Waco. Many contractors from the Abilene area attended both sessions.

The Abilene meeting, said to have been the best attended session in recent years, adjourned following a luncheon Monday afternoon.

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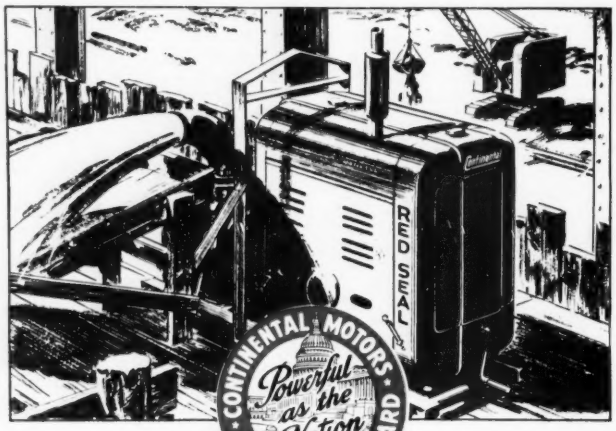

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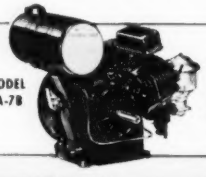

MODEL AA-78

Continental Motors Corporation
MUSKEGON, MICHIGAN

Obituary

Walker John Boudwin, Reno contractor and president of the Nevada Chapter, A.G.C., died July 20 after a long illness.

Mr. Boudwin, long active in the affairs of the construction industry in Nevada, is credited with doing much toward interesting affiliate members (subcontractors) in the chapter.

Founder and owner of the construction company which bears his name, he was general contractor on many major building projects in Nevada, specializing in large buildings and housing developments. The Walker Boudwin Const. Co. built the Veterans' Memorial School in Reno, the Marine Reserve Building on the University of Nevada campus, the new Reno city jail, a new state office building in Carson City, and some of the buildings at the state mental hospital.

Born in Philadelphia, Mr. Boudwin attended the public schools there and later received a degree in mechanical engineering from Temple University. He moved west and took various engineering jobs until he founded his own contracting firm in 1920.

He is survived by his widow, Mrs. Dorothy Richardson Boudwin, Reno; his only son, Rodney, who will manage the company; a granddaughter, Nancy Boudwin, Reno; and a niece, Mrs. Elizabeth Asbury, Newburg, N. J.

John Adolph Lindstrom, 74, St. Paul contractor for many years, died July 29 following a long illness.

Born in Wastergotland, Sweden, Mr. Lindstrom came to this country in 1900 living first in Mankato, Minn., then moving to St. Paul in 1904.

He had been a member of the Associated General Contractors of Minnesota, and of the general contracting firm of Lindstrom and Anderson.

Mr. Lindstrom is survived by his widow, Mrs. Selma Katherina Lindstrom; four sons, John H., Roy E., and Donald J., of St. Paul and Howard G., of Arden Hills, Minn.; a sister, Mrs. Nels Peterson of Atwater, Minn.; and four sisters in Sweden.

Sid O. Ponath of McLaughlin, Inc., of Great Falls, Mont., and Valdez, Alaska, died Aug. 14 following an accident on a project in Valdez.

Mr. Ponath, active in the Alaska Chapter of the A.G.C., is survived by his family living in Seattle.

Air entraining concrete can fit ...like a glove!

Construction men know that proper air entrainment results in concrete that's more workable, more versatile, and more durable. But . . . like no glove will fit *every* hand perfectly . . . no standard air entraining cement will make concrete that fits every *job* perfectly.

The reason is simple. All brands of air entraining cement are made according to strict Federal and ASTM specifications—designed to produce concrete that's right for the "average" job. But when mixed with local materials, air entraining cement can fail to meet the specific requirements of the job—due to the effect of the aggregate, its gradation, and even the temperature, on the air entraining capacity of the mixture.

That's why it's wise, before you specify air entraining cement for your next job, to first make certain that it will combine with local materials and the job conditions to produce concrete that is best for that job. But why gamble when the "prescription" method—using regular portland cement and adding the *required* amount of any well known air entraining agent at the mixer—always pays off in quality concrete. You'll find that this method goes hand-in-glove with perfect performance every time.

Just remember, use air entraining cement only when you're *sure* that it "fits" . . . and remember, too—you can't buy better portland or air entraining cement than Marquette.

★ ★ ★

If you have any problems or questions on the use and mixing of air-entrained concrete, the Marquette Service Engineer will be glad to help and advise you —contact any Marquette office.

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Small Contractor Shows How Safety Pays

• Dallas Firm Proves Accident Prevention Is Not Expensive

» THE SMALL general contractor, who is sometimes inclined to think that a planned and effective safety program is only for the large contractor who can afford to spend "big money" for safety engineers, signs, literature and other material, can find a lesson in safety experience from the Peterson Constr. Co., a small organization and member of the Dallas Chapter of The Associated General Contractors of America.

Edmund G. Peterson, owner of the company, is a young man who at the end of the war got out of the service and into the construction business in Dallas. He began first as an estimator for a large company, and then after he had saved a small stake, founded his own contracting firm.

"Pete" Peterson is an enthusiast for the cause of job safety. Two years ago he studied the accident problem intensely for several months and called in his supervisors to outline his ideas about safety.

Taking the industry averages as a criterion, Pete told his men that every time a contractor completes 48,000 man-hours of exposure without a fatality, he has saved one life.

"So, let's get busy and save some lives," Pete told his crew.

No Heavy Expenditures

Out of this spirit he developed a program embracing no heavy expenditures. Before he starts a new job, Peterson calls a safety meeting of his supervisory personnel as soon as the mobile office is moved onto the site. He outlines the special hazards to be encountered on that particular job from an accident-potential standpoint, puts up a big sign with a painted thermometer showing the company's long record of accident-free operation, and moves up the mercury as the hours are piled up.

His men are enthusiastic about their safe record and work to stretch it out as far as possible. Every man, a voluntary safety engineer, keeps his eyes peeled for hazardous situations or conditions which could result in an accident. When found, the hazards are reported to the foreman or superintendent who takes immediate steps to eliminate the dangers.

A trained engineer himself, Peterson applies common-sense engineering knowledge to his projects, supplemented by some technical assistance from his insurance carrier's safety engineering department.

Instead of using ordinary paper drinking cups, Pete has printed on them a safety reminder slogan. New slogans are introduced periodically to maintain the interest of the men.

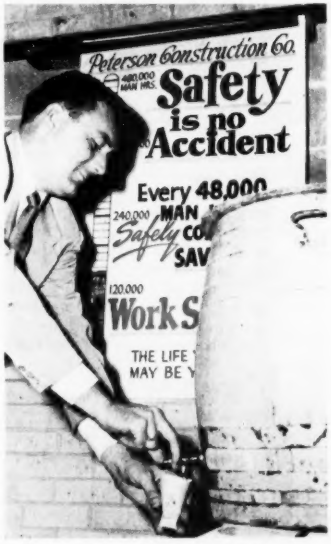
Does it pay off?

"You bet," says Peterson. "We began our organized safety campaign on October 1, 1950 . . . and have not had a lost-time accident since that day on any job."

Three Lives Saved

On July 1, 1952 his company passed 158,242 man-hours of exposure, representing three lives saved, "and we are still going strong," he added.

"Sure, we have saved some money. We have a good credit rating on our insurance premiums, but the big kick we get is the fact that we're saving lives—our men are out there laying brick, pouring concrete and framing buildings, instead of lying on hospital beds, broken, crippled and suffering or occupying cemetery lots because of accidents that should have been prevented."



Typical safety sign is displayed next to water barrel by Pete Peterson.

STANDARD FORMS

COVERING IMPORTANT CONTRACTING PROCEDURE

Prepared by The Associated General Contractors of America and Cooperating Bodies

Order No.	MANUALS	Per Copy	Per Dozen	Per 100
1.	A.G.C. Manual (Contains documents listed below: Nos. 3-30, inclusive, and Nos. 34, 35, 36, 36a, 37, 38)	$5.00	$50.00	———
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36a.	Contractors' Pump Standards			
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Metal Seals and Decals: 20% discount for orders of more than 50; 40% discount for orders of 200 or more.

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Form SS1: Application for Employment; Form SS2: Employees' History Record; Form SS3: Employees' Employment and Earnings; Form SS4: Payroll. List of prices and styles will be furnished to A.G.C. members on request.

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Sept. 1952

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to better production at lower cost:

Put an Employers Mutuals Team to work for you, with you on a practical safety program that conserves man-power, machines and materials by reducing costly accidents. This "team-work" may easily bring you spectacular savings in insurance costs, too!

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EMPLOYERS MUTUAL LIABILITY INSURANCE COMPANY OF WISCONSIN
EMPLOYERS MUTUAL FIRE INSURANCE COMPANY

ACCIDENT PREVENTION

Safety Executive Dies

Lloyd A. Blanchard, 58, of Washington, D. C., director of the rescue division of the Federal Civil Defense Administration, and leader in the field of accident prevention, died July 26, following a short illness.

Mr. Blanchard

He had been in government service since 1941, beginning as director of the safety program of the Quartermaster General in 1941. President Truman then appointed him to serve as assistant to the general chairman, Federal Interdepartmental Safety Council and then to be assistant executive director of the President's Conference on Industrial Safety in 1948.

Mr. Blanchard is survived by his widow, Mrs. Margaretha Wassung Blanchard; a son, Ralph W., Oak Ridge, Tenn.; and a granddaughter, Carol Ann Blanchard. Burial was in Arlington National Cemetery, Arlington, Va.

Indirect Cost of Accidents

The accident: A mason tender while passing a piece of limestone to a foreman, dropped the stone on the foreman's foot, breaking it and disabling him for nine weeks.

Direct cost: $330 for medical and compensation.

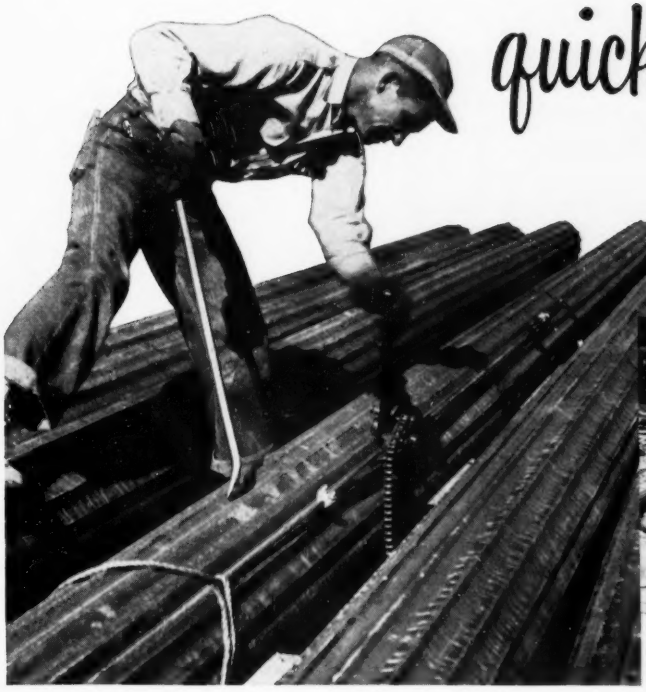
Proximate results: The contractor had to replace his valuable foreman with another man receiving the same wages but who could not match the production of the injured man. The new foreman lacked the other's ability to keep his workers and obtain maximum production from them.

Indirect cost: In this case the indirect cost, though unmeasured, was known to be much greater than the medical and compensation expenses when compared with the loss of the services of the valuable foreman.

Prevention: Instruct workmen that negligence and carelessness can never be tolerated on a construction job because in a split second injury or death may result.

You can extend MONOTUBE PILES

quick and easy!

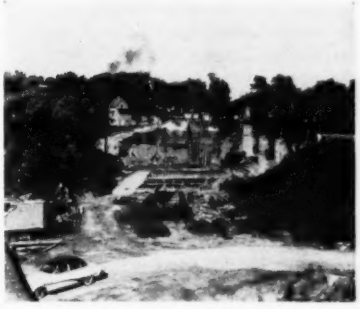


Above: Speedy nesting and welding operations on an assembly rack in the field. Tailoring piles to the required length, on the job, minimizes cut-off waste.

HERE, on a typical job, you can see the simplicity of extending Monotube piles in the field. In the photo above, a Monotube extension is being nested with a "come-along" and two cable chokers. On the same rack, as shown at right, a welder completes the job. The operation is fast . . . and sure!

There are many other Monotube advantages . . . cold-rolled strength for extra structural values . . . light weight for easier handling . . . speedier installation with light, mobile driving equipment . . . fast, easy inspection before concreting . . . simplified cut-offs with minimum waste . . . and a proven excellence in transmitting loads to penetrated soil.

Add up these important qualities and you'll see why taper-flute Monotubes are preferred by so many experience-wise engineers and contractors on foundation jobs of every description. For complete data write to The Union Metal Manufacturing Company, Canton 5, Ohio.



Overall view of foundation work for new bridge showing storage yard, pile assembly rack at left, and driving operation in background.

UNION METAL

Monotube Foundation Piles

Modern Building Design Calls for More Emphasis on Door Efficiency

Like the WHEEL . . .

KINNEAR Rolling Doors are HERE TO STAY!

Like the rolling action of the wheel, the smooth upward operation of Kinnear Rolling Doors involves basic, unchanging principles of engineering efficiency. The door's advantages have been proved in thousands of installations, through more than half a century.

Today the dollar-saving importance of these Kinnear advantages is getting closer attention from building designers everywhere. As building *construction, operation* and *maintenance* costs continue to rise, the space, time, labor *and construction costs* that can be saved with efficient doors are major items in any business operation.

Kinnear's rugged curtain of interlocking metal slats opens straight upward. It coils compactly out of the way above the opening. Floor, wall and even ceiling space remain fully usable at all times. The door clears the opening from jamb to jamb, and from floor to lintel, completely out of traffic's way. When open, it is safe from damage by wind or vehicles. When closed, it presents an all-metal barrier that assures extra protection against storms, intruders, and fire.

In addition, Kinnear Rolling Doors provide smooth, easy operation under all conditions. They may be controlled manually, mechanically (by chain or crank) or electrically. Motor operated doors can be equipped with any number of remote control switches, for highest convenience. Kinnear Rolling Doors are built of various metals, in any size, for easy installation in old or new buildings. Let us send you complete information.

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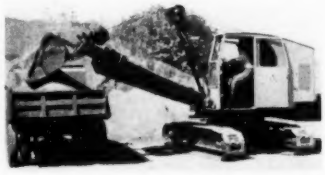
SAVING WAYS to DOOR WAYS
KINNEAR ROLLING DOORS

NEW EQUIPMENT • MATERIALS

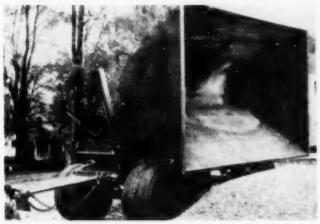
Shovel—*The Thew Shovel Co., Lorain, Ohio.* Scoop shovel for underground or surface loading operations consists of front-end attachment that may be applied to any basic full-revolving TL-25 turntable. It is equipped with 1¼-yd. dipper in place of ¾-yd. dipper used on standard TL-25 shovel. Attachment consists of short boom 8′6″ long, at front end of which is located cable-driven shipper shaft with pinions located at outer ends. Dipper is attached to double dipper stick which is crowded in or out in telescopic manner through dipper stick sleeves rigidly fastened to outer end of boom. Under side of each dipper stick is equipped with rack or teeth which mesh with pinions on outer ends of shipper shaft. Machine can load on down, level or up grade, depending on position of boom. When boom is in horizontal position, dipper may be moved in or out through stroke of 6′ to 7′. Front end is raised for dumping by 3-part hoist line. Dipper is dumped by tripping release actuated through lever next to operator. On underground operations shovel can travel through entries 9′6″ high and can operate in headrooms as low as 10′6″.



Thew scoop shovel

Side-Dump Truck Bodies—*Galion Allsteel Body Co., Galion, Ohio.* New line of bodies are named "Roll-Over," and are available in variety of sizes. They dump to right or left side. Bodies are of 10 gage steel, can be mounted on all standard trailers. Self-contained subframe consists of 3 heavy box-type outrigger cross members. Front and rear outriggers are built with series of gear-like teeth which roll inside formed channel tracks welded to body. This construction locks body in stationary position. Main locking mechanism is down-pull spring-loaded type plunger pin which engages in socket built into angle welded to head of body. Lock pin is actuated by lever mounted to A-type frame welded to front of subframe. Lever can be operated from

either side of body. To dump, driver disengages spring lock chain on opposite side of body to which load is to discharge, then releases plunger lock lever. Bodies can be righted manually or by slight snaking movement of truck.



Galion "Roll-Over" side dump truck

Pneumatic Drills, Grinders—*Independent Pneumatic Tool Co., Aurora, Ill.* New line of light-weight "Thor" pneumatic drills, screwdrivers, nut setters and grinders range in weight from 1 lb., 1 oz. grinder to 2 lb., 11 oz. angle screwdriver and feature interchangeability of housings, handles and attachments. New rotary air motor provides maximum power output at standard air-line pressures. Thirty-one sizes are offered in drill line, including angle attachment models in 30°, 45°, and 90° and choice of offset grip, button or lever throttle and optional chuck or collet. Speeds range from 850 r.p.m. to 1,400 r.p.m. for drilling in aluminum, with total of 9 different speeds available. Screwdrivers and nut setters number 48 sizes, 28 of them angle types in 25° and 90° models. Complete range of direct drive or slip clutch attachments, with offset or lever throttle handles is offered.

Wire Rope Splicer—*Quay Industries, 910 17th St., N. W., Washington 6.* "Torquemaster No. 10" is designed to handle $\frac{3}{8}$" to $1\frac{1}{4}$" wire rope. Resistance regulator and swivel action jaws enable it to overcome cable torque. With small jaws, its capacity is $\frac{3}{8}$" to 1", it is $2'2\frac{3}{4}$" long, 1' high mounted, has $6\frac{3}{4}$" maximum width between jaws and 6" maximum depth point of jaws to thimble block. With large jaws, its capacity is $\frac{3}{4}$" to $1\frac{1}{4}$", it is 2' 9" long, 1'1" high mounted, maximum width jaws open, $8\frac{1}{2}$", maximum depth point of jaws to thimble block, $8\frac{1}{4}$".

WARCO® is the completely versatile motor grader that meets every job requirement from rough cut to finish grading . . . beats deadlines, keeps grading costs down. WARCO is the *only* motor grader whose cab-controlled blade reaches every working position, including 90°, without lost-time manual adjustment.

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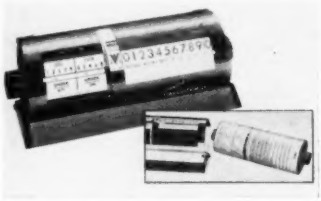
W. A. RIDDELL CORP., Bucyrus, Ohio
BUILDERS OF WARCO MOTOR GRADERS • HERCULES ROAD ROLLERS

Pump—*Hypro Engineering, Inc., 404 N. Washington Ave., Minneapolis 1.* Direct-drive, roller-type transfer pump is designed to fit power take-off shafts on tractors, trucks and similar construction equipment. Called Model 750, it is recommended for such jobs as drainage, fire fighting, flushing and insect control spraying. It is self-priming, will deliver approximately 15 g.p.m. at 600 r.p.m. and has pressure range from 0 to 350 lbs. per sq. in. Pump has $\frac{3}{4}$" pipe connections and mounts directly on power take-off shaft. It can be furnished with base plates and solid shaft for gas engine belt and pulley drive. Pump weighs 11 lbs.

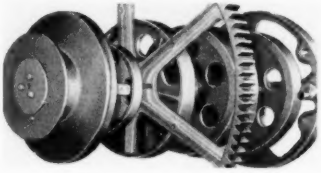
Payroll Tax Computer — *Ayres Corp., Box 1081, Wilmington, Calif.* Computer gives direct "window" readings on single line of F.I.C.A. (F.O.A.B.) and withholding tax deductions. Drums carrying computing tables are interchangeable for weekly, bi-weekly, monthly or semi-monthly pay periods. Dial rotates drum within clear cylinder which reveals correct tax computations for any salary, no matter what pay period or dependents.



Ayres payroll tax computer

High-Density Concrete—*Lee-Don, Inc., Harmarville, Pa.* New densifier for high heat-conductive concrete for radiant heating is called "Heaterete." Chief ingredient of product is mineral additive in granular form which does not expand or contract. It has thermal conductivity of 21 and attracts but does not absorb water so that water is kept evenly distributed through concrete. It provides hard abrasive-resistant floors with glaze-like finish.

Magnetic Tagline—*Osgood Co., Marion, Ohio.* Magnetic tagline for use on clamshell or electro-magnet services consists of drum, mounted on extension of hoisting drum shaft, which is provided with series of "permanent" magnets. By their magnetic attraction to flange of tagline drum, constant pull is exerted on tagline rope. Different "pulls" can be obtained by varying number of magnets. It requires no adjustment or maintenance.



Osgood magnetic tagline

SAVINGS FLOW FROM SPEED-LAY PIPE SYSTEM

EVERYTHING for a COMPLETE PORTABLE PIPE SYSTEM

ALBERT
PIPE SUPPLY CO., INC.
Berry at North 13th St., Brooklyn 11, N. Y.
Phone EVergreen 7-8100

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FACTORY PACKAGED
PIPE — COUPLINGS
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Immediate Installation
by one unskilled man. 2½ to 12½ o.d. black or galvanized. Larger sizes can be furnished. Ready to lay—without delay.

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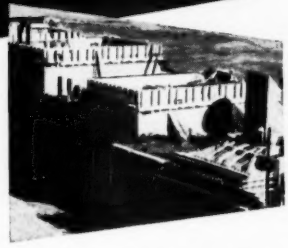
ALBERT PIPE SUPPLY CO., INC.
Berry & N. 13th St., Brooklyn 11, N. Y.
Please send free booklet describing your Speed-Lay Pipe System and services:
NAME.....
FIRM NAME.....
ADDRESS.....
CITY.....STATE.....

BONDS—
for Contractors
FAST, COUNTRY-WIDE SERVICE



- BONDS—Bid and Performance
- Equipment Floaters
- Complete Casualty Insurance Requirements

American Surety Company
100 Broadway • New York 5, N. Y.
Agents and Brokers Everywhere

Engines—*Caterpillar Tractor Co., Peoria 8, Ill.* Increased r.p.m. in smaller engines is announced by Caterpillar. D318 electric set now has rating of 60 k.w. at 1,800 r.p.m., D315, 40 k.w. at 1,800 r.p.m., D311, 30 k.w. at 1,200 r.p.m. D311 electric sets will be available to deliver current in single-phase voltages at 1,800 r.p.m. at 25 k.w. rated.

Tractor—*Oliver Corp., 19300 Euclid Ave., Cleveland 17.* New disc brake design for industrial wheel tractors is self-energizing. Light pressure on pedal holds equally well forward or backward. Brakes will hold heavy loads on inclines, make short turns and control tractor more easily.

Truck Engine—*General Motors Truck and Coach Division, Pontiac 11, Mich.* New 302 cu. in. engine has compression ratio of 7.2 to 1 and generates 145 gross brake h.p. at 3,600 r.p.m. It weighs 545 lbs. (dry). It will be placed in G.M.C. 450 and 470 ($2\frac{1}{2}$-ton and 3-ton) model series trucks and tractors.

Earthmoving Tire Repairing—*The Forbush Co., 110 Grand Ave., Pueblo, Colo.* "Vulco-Bolted" method of tire repairing uses flat-headed bolts which are covered with live rubber, so that inner tube is not harmed. Bolts create tight bond for section and prevent it from slipping. Tire break cannot reopen. Forbush pays freight charges on tires shipped to it.

"Vulco-Bolted" tire repair

ANOTHER BREAK IN THE DIKE!

Tough words to hear when you're battling a river on a rampage. But that's what happened during the recent disastrous floods on the Fraser River in British Columbia.

Perhaps you don't have to keep "rivers caged up," but that's an important job for Fraser River Pile Driving Co., Ltd. and their experience *again proves* the unusual mobility and handling ease of MICHIGAN cranes.

Says K. A. Matheson of the above company, "In the City of Mission on the Fraser River, the MICHIGAN cranes did a splendid job owing to their mobility and being able to get from one break in the dikes to another in very short order. In particular the TLDT-20 with remote control was a decided advantage, as it enabled us to do the same work with one less man when labor of this sort was badly needed on other flood-fighting work."

Regardless of your type of work, when you need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's your best buy!

MICHIGAN POWER SHOVEL COMPANY

485 Second Street, Benton Harbor, Michigan, U. S. A.

Glass Insulation—*Pittsburgh Corning Corp., 307 4th Ave., Pittsburgh 22.* Specifications for application of "Foamglas" in low-temperature space installations are given in booklet. It presents information about new application methods for "Foamglas" on ceilings, walls, floors, columns and beams. It lists finishes, adhesives, sealers, suggested thicknesses, paints and properties of material. . . . Use of "Foamglas" in sandwich panel construction is presented in new folder. Use of concrete sandwich panels in various types of buildings is discussed.

Grader Maintenance Chart—*The Galion Iron Works & Mfg. Co., Galion, Ohio.* Chart for service and maintenance of Galion Models 118, 116, 104, 103, 102, 203 and 202 motor graders treats proper lubrication and adjustments. Among parts covered are hydraulic system, steering controls, clutch, drawbar and circle, fuel system, brakes. Included is list of distributors where Galion parts and service are available.

Masonry Drills—*Termite Drills, Inc., 99 N. Lotus Ave., Pasadena 8, Calif.* "Termite" rotary masonry drills are presented in bulletin. Features and operation of drills are discussed and complete list of concrete "Termites" and core "Termites" is included.

Grader—*J. D. Adams Manufacturing Co., Indianapolis.* Folder presents Motor Grader No. 512, which now has rubber-mounting of engine and rated h.p. of 85, compared to 76 h.p. of earlier model. Folder gives specifications and lists optional equipment.

Dryer-Mixer—*Barber-Greene Co., Aurora, Ill.* Bulletin describes design and development of new "Mixall," portable unit for producing quality hot patch material. Booklet shows operation of machine, presents typical operating capacities.

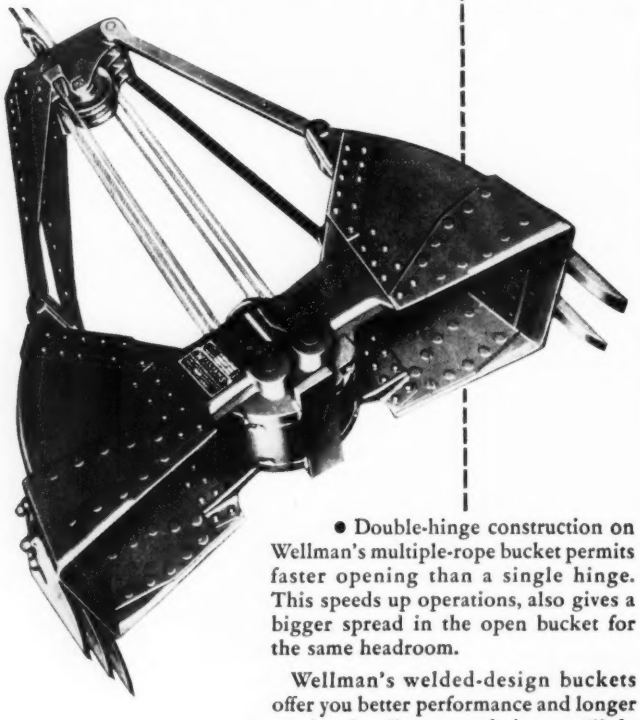
Conveyor Belts — Barber-Greene offers new bulletin on its line of conveyor belts. Major causes of belt failure are discussed and engineering research to overcome them is described. Belt selection tables are included. Representative types of belt protective equipment are briefly treated.

Structural Steel Bolts — *Paper, Calmenson & Co., St. Paul 8.* "Pacal" high-tensile structural steel bolts are presented in Bulletin 600. Development and applications of product are described and advantages and economies of bolts in place of rivets for assembling structural joints are discussed. Sizes in stock are given as well as specifications for assembly of structural joints using steel bolts, and A.S.T.M. tentative standard specifications for steel bolts and studs.

Dump Trucks—*The Euclid Road Machinery Co., Cleveland 17.* Models 1FFD and 4FFD rear-dump 34-ton-capacity Euclids are presented in new catalog. Featured is twin-power, provided by side-by-side diesel engines of 380 and 400 total h.p. Detailed specification data are included.

WELLMAN *Williams Type*

FAST BUCKET OPENING SPEEDS OPERATIONS



• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

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THE WELLMAN ENGINEERING COMPANY
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Cleveland 4, Ohio

NEW LITERATURE

Pipe Fittings—*Naylor Pipe Co., 2130 E. 92d St., Chicago 19.* Bulletin 525 on standard and special fabricated fittings includes specifications and prints on standard fittings for lightweight pipe. It also presents illustrations of special fabrications.

Pumps—*Carver Pump Co., Muscatine, Iowa.* Self-priming centrifugal pumps and diaphragm pumps are presented in Bulletin 110. Complete information is given about each Carver machine. Capacity tables are included.

Trencher—*Parsons Co., Newton, Iowa.* Operating features of Model 88 "Trenchmobile" are presented in new bulletin. Field photos illustrate telescopic ladder-type boom for undercutting sidewalks and old mains, controlled discharge through reversible and shiftable belt conveyor, hinged crumber, self-sharpening "Tap-In" bucket teeth, positive down-crowd digging boom.

Back Hoe—*Schield Bantam Co., Waverly, Iowa.* Truck-mounted 3/8-yd. back hoe is presented in illustrated folder. Engineering information on mechanical features is included, together with large chart showing dimensions and operating data. Specifications are also included on interchangeable 2½-ton crane adaptor and 2 types of backfill blades.

Available with Pneumatic Tires Steel Wheels or Skids

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Self-Priming

CENTRIFUGAL PUMPS

Engine, belt, and electric driven pumps with many new features to give you low cost, dependable performance. A. G. C. rated. Easily replaced wearing parts keep Rice Pumps young at low cost.

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NATIONAL SURETY CORPORATION

4 Albany Street, New York

NEW LITERATURE

Curtain Wall Construction—*United States Plywood Corp., 55 W. 44th St., New York 36.* "Armorply Building Panels" are presented in new bulletin. Suggested design details and specification are given for panels for interiors and exteriors, foundations and framework.

Asphalt Paving Plant—*Madsen Iron Works, Inc., P.O. Box 589, Huntington Park, Calif.* "Little Monster" portable asphalt paving plant is presented in Bulletin LM-1. Specifications are given, detailed description of plant, with illustrations, is included and features, such as power plant, feeding device, dual dryers, hot stone elevators, 2-compartment storage bin, weigh box and asphalt bucket are explained.

Excavators, Crane—*Gar Wood Industries, Inc., Wayne, Mich.* Three new specification booklets show detailed information on new Gar Wood $\frac{3}{4}$-yd. Models 75A and 75B excavators and 75BT truck crane. Capacities, ranges and dimensions are given, together with information on power plants, right-angle drive, travel speeds and controls.

Trailer Hoists and Bodies—Gar Wood Bulletin W-105 presents cam-and-roller and telescopic hoists. Included are front-mounted telescopic TV85 with 30-ton capacity, T4430 twin telescopic hoists with 16-ton capacity and F8C cam-and-roller hoist with 15-ton capacity and F77C cam-and-roller with 25-ton capacity.

Tractor-Mounted Tools—*Hyster Co., 2903 N.E. Clackamas St., Portland 8, Oreg.* Booklet, *A Story of Tractor Tools and Their Uses,* presents in cartoon style uses of tractor-mounted tools in construction and other industries.

Hoists and Bodies—*St. Paul Hydraulic Hoist, Wayne, Mich.* Re-designed line of hoists and bodies is presented in new catalog. Innovations included are: "Lo-Mount" cylinder heads, low operating oil pressures, new sub-frame design permitting unit to flex with chassis movements, replaceable bushings at critical load points, sealed dash-mounted cable controls to valve and power take-off, friction-free power through improved pump, valve, power take-off and drive line. Complete specifications and capacities are included.

MANUFACTURERS' NOTES

A.C. Bellows, formerly crusher sales engineer for AUSTIN-WESTERN Co., has been appointed sales manager, crusher department, Construction Equipment Division, BALDWIN-LIMA-HAMILTON CORP.

W E. Difford has been named managing director of DOUGLAS FIR PLYWOOD ASSN., succeeding O. Harry Schrader, Jr., who has resigned to take an executive post with United States Plywood Corp.

John R. Gilmartin has been appointed general sales manager of HYATT BEARINGS DIVISION OF GENERAL MOTORS CORP., succeeding Howard K. Porter who has been named assistant to general manager.

The board of directors of LAPLANT-CHOATE MANUFACTURING Co. has approved an agreement and plan of reorganization with ALLIS-CHALMERS MANUFACTURING Co. The plan had been approved previously by directors of Allis-Chalmers. Continued operation of the LaPlant-Choate plant and facilities at Cedar Rapids is planned.

B. Pratte has been appointed general sales manager of HARNISCHFEGER CORP. . . . Don E. Sweeney, formerly with General Motors Corp., has been appointed sales manager of Harnischfeger's Diesel Engine Division.

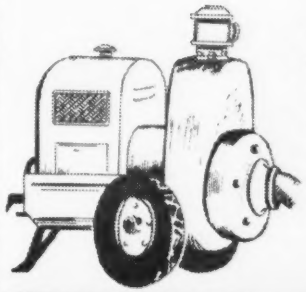
John A. Riley has been elected secretary and treasurer of THE TIMKEN ROLLER BEARING Co., succeeding the late R. C. Brower.

The National Safety Council has presented an award of merit to the 300 employees of Plant No. 3 in the Construction Machinery Division of CHAIN BELT Co., for performance of 1,297,204 man-hours of work, from May 29, 1950, to December 31, 1951, without a disabling injury.

Acquisition of E. C. ATKINS AND CO., century-old saw manufacturing concern, is announced by BORG-WARNER CORP. It will be operated as the Atkins Division of Borg-Warner.

Robert Watt Miller has been elected a director of CATERPILLAR TRACTOR Co., filling the vacancy created by the death of his father, C.O.G. Miller . . . Delmar R. Lammers has been appointed service manager.

How To Judge a Pump



An A.G.C. Standard Plate is like a BLUE RIBBON! If a pump is wearing the A.G.C. label—don't hesitate to give it an "A No. 1" rating at first glance. For to be tagged with the A.G.C. label, pumps must meet certain basic standards of performance established by the Pump Bureau and approved by the A.G.C. Through the Pump Bureau—the reliable pump manufacturers listed below guarantee the standards approved by the A. G. C.

CONTRACTORS PUMP BUREAU
(Established 1938) Affiliated with . . .
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Munsey Building, Washington 4, D. C.

STERLING MACHINERY CO. Los Angeles, California	**CARVER PUMP CO.** Muscatine, Iowa	**THE JAEGER MACHINE CO.** Columbus, Ohio
WORTHINGTON CORPORATION Construction Equipment Division Plainfield, New Jersey	**C. H. & E. MANUFACTURING CO.** Milwaukee, Wisconsin	**MARLOW PUMPS** Ridgewood, N. J.
	CHAIN BELT CO. Milwaukee, Wisconsin	**NOVO ENGINE CO.** Lansing, Michigan
LEYMAN MFG. CORP. Cincinnati 2, Ohio	**CONSTRUCTION MACHINERY CO.** Waterloo, Iowa	**RICE PUMP & MACHINE CO.** Grafton, Wisconsin
BARNES MANUFACTURING CO. Mansfield, Ohio	**THE GORMAN-RUPP CO.** Mansfield, Ohio	**ESSICK MANUFACTURING CO.** Los Angeles, California

Manufacturers' addresses are listed on page 110

Air Entraining Agents
A. C. Horn Co.

Asphalt Plants (Portable)
Barber-Greene Co.
Iowa Mfg. Co.
White Mfg. Co.

Axles (Truck)
Eaton Mfg. Co., Axle Division

Backfillers
Bucyrus-Erie Co.
Cleveland Trencher Co.
Gradall Division
Harnischfeger Corp.
Parsons Co.

Batchers
Blaw-Knox Division
Butler Bin Co.
Construction Machinery Co.
Heltzel Steel Form & Iron Co.
C. S. Johnson Co.

Bearings (Anti-Friction, Tapered Roller)
Hyatt Bearings Division
Timken Roller Bearing Co.

Bins
Blaw-Knox Division
L. Burmeister Co.
Butler Bin Co.
Heltzel Steel Form & Iron Co.
Iowa Mfg. Co.
C. S. Johnson Co.

Bits (Detachable Drill)
Ingersoll-Rand Co.
Timken Roller Bearing Co.

Blades (Grader, Maintainer, Snow Plow, Bulldozer, Scarifier)
Paper-Calmenson & Co.
Shunk Manufacturing Co.

Bridges
Armco Drainage & Metal Products

Buckets (Clamshell & Dragline)
Blaw-Knox Division
Bucyrus-Erie Co.
Harnischfeger Corp.
C. S. Johnson Co.
Wellman Engineering Co.

Buckets (Concrete)
Blaw-Knox Division
Construction Machinery Co.
Heltzel Steel Form & Iron Co.

Building Papers
Sisalkraft Co.

Buildings (Steel)
Allied Structural Steel Cos.
Armco Drainage & Metal Products
Arrowhead Steel Buildings, Inc.
International Steel Co.
Macomber, Inc.
Truscon Steel Co.

Bulldozers
Bucyrus-Erie Co.
R. G. LeTourneau, Inc.

Car Pullers
Clyde Iron Works

Cement (Common and Special)
Lehigh Portland Cement Co.
Lone Star Cement Corp.
Marquette Cement Mfg. Co.
Universal Atlas Cement Co.

Cement (White)
Trinity White, General Portland Cement Co.
Universal Atlas Cement Co.

Clamps (Hose)
Dixon Valve & Coupling Co.

Compressors
Allis-Chalmers Co.
Ingersoll-Rand Co.
LeRoi Co.

Concrete Curing Material
A. C. Horn Co.
Sisalkraft Co.

Concrete Mixers, Pavers, Tampers
Chain Belt Co.
Construction Machinery Co.
Foote Co.
Jaeger Machine Co.
Knickerbocker Co.
Koehring Co.
Kwik-Mix Co.
T. L. Smith Co.
Worthington Corp.

Concrete Vibrators
Concrete Surfacing Machinery Co.
Electric Tamper & Equipment Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Mall Tool Co.
Master Vibrator Co.
Vibro-Plus Products, Inc.
White Mfg. Co.

Conveying Machinery
Barber-Greene Co.
Chain Belt Co.
G. N. Crawford Equipment Co.
Iowa Mfg. Co.
Link-Belt Co.

Cranes
Austin-Western Co.
Bucyrus-Erie Co.
Cleveland Trencher Co.
Clyde Iron Works
Harnischfeger Corp.
Koehring Co.
R. G. LeTourneau, Inc.
Link-Belt Speeder Corp.
Michigan Power Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

WISCONSIN-Powered Joint Cleaner Helps Prepare WRINKLE-FREE Runways

POWER TO FIT THE MACHINE — POWER TO FIT THE JOB

Powered by a 13 hp. Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine, this Model "G" Tennant joint cleaner, manufactured by the G. H. Tennant Co., Minneapolis, Minn., prepares airport pavement joints for re-sealing. The machine routs out shrunken old seal, pebbles and dirt, refacing side-walls at the same time.

Helping to prepare smooth, "wrinkle-free" runways is another typical power service application in which Wisconsin Air-Cooled Engines fit both the machine and the job.

You can't do better than to specify "Wisconsin" for any purpose that requires dependable engine power within a 3 to 30 hp. range.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

RENT
these cost-reducing forms for concrete

Cost records from job after job prove that Economy's system of Form Engineering and Rental Service means substantial savings in TIME—MATERIAL—MONEY for GREATER PROFITS.

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ECONOMY METAL FORMS

Crushing Machinery
Allis-Chalmers Co.
Austin-Western Co.
Iowa Mfg. Co.

Culverts
Albert Pipe Supply Co.
Armco Drainage & Metal Products

Cutters (Abrasive)
Wodack Electric Tool Corp.

Decking (Roof Steel & Aluminum)
Macomber, Inc.

Derricks
Clyde Iron Works

Doors (Metal, Wood)
Ceco Steel Products Corp.
International Steel Co.
Kinnear Mfg. Co.
R. C. Mahon Co.
Truscon Steel Co.

Dredging Machinery
Bucyrus-Erie Co.
Harnischfeger Corp.
Northwest Engineering Co.

Drills & Drilling Machinery
Bucyrus-Erie Co.
Buda Co.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drills (Electric)
Wodack Electric Tool Corp.

Elevators (Material)
Chain Belt Co.
Iowa Mfg. Co.
Link-Belt Co.

Engines
Allis-Chalmers Tractor Div.
American Hoist & Derrick Co.
Buda Co.
Caterpillar Tractor Co.
Continental Motors Corp.
Cummins Engine Co.
Detroit Diesel Engine Division
Harnischfeger Corp.
Ingersoll-Rand Co.
International Harvester Co.
LeRoi Co.
Wisconsin Motor Corp.

Expansion Joints
Laclede Steel Co.

Financing
C.I.T. Corp.

Finishing Machines (Bituminous)
Barber-Greene Co.
Blaw-Knox Division

Finishing Machines (Concrete)
Blaw-Knox Division

Flooring
Truscon Steel Co.

Forms (Concrete) and Accessories
Blaw-Knox Division
Economy Forms Corp.
Heltzel Steel Form & Iron Co.
A. C. Horn Co.
Joseph T. Ryerson & Son, Inc.
Symons Clamp & Mfg. Co.
Universal Form Clamp Co.

Generating Sets (Electric)
Caterpillar Tractor Co.
Master Vibrator Co.

Graders
J. D. Adams Mfg. Co.
Allis-Chalmers Tractor Div.
Austin-Western Co.
Caterpillar Tractor Co.
Euclid Road Machinery Co.
Galion Iron Works & Mfg. Co.
Gradall Division
Koehring Co.
W. A. Riddell Corp.

Gravel Plants (Portable)
Iowa Mfg. Co.

Grinders (Electric)
Independent Pneumatic Tool Co.
Wodack Electric Tool Corp.

Hammers (Electric)
Independent Pneumatic Tool Co.
Master Vibrator Co.
Wodack Electric Tool Corp.

Hoists
American Hoist & Derrick Co.
Clyde Iron Works
Construction Machinery Co.
Harnischfeger Corp.
Ingersoll-Rand Co.
McKiernan-Terry Corp.

Hose (Air, Water, Steam, Suction)
United States Rubber Co.

Industrial Financing
C.I.T. Corp.

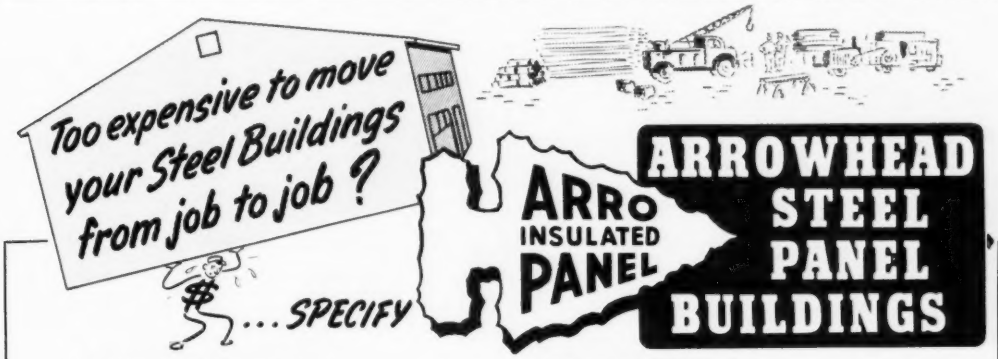
Insurance (Automobile, Casualty, Compensation, Liability)
Aetna Casualty & Surety Co.
Central Surety & Insurance Corp.
Employers Mutuals of Wausau

Jacks
Buda Co.

Jacks (Scaffold)
Wilson-Albrecht Co.

Joists (Steel)
Ceco Steel Products Corp.
Laclede Steel Co.
Macomber, Inc.

Kettles, Heating (Asphalt & Tar)
White Mfg. Co.


Too expensive to move your Steel Buildings from job to job ?
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ARRO INSULATED PANEL
ARROWHEAD STEEL PANEL BUILDINGS

√ **LARGER COMPONENTS**
Lower erection time, knock-down time, and re-erection time saves money for you.
ArroPanels are over 10 times as large as ordinary building panels, yet can be handled with a minimum of labor. All bolted construction—no welding or cutting required in assembly.

√ **EASIER TO SHIP**
ArroPanels lie completely flat. Weigh only 3.3 lbs. per square foot. Doors and windows built into panels.

√ **MORE ECONOMICAL**
Larger panels mean lower square foot panel cost without sacrificing quality. ArroPanels are individually engineered and insulated to your specifications.

√ **BETTER INSULATED**
Hollow-wall construction with fully ventilated reflective and or fiber-glass insulation eliminates condensation and provides comfortable, workable shelter in the most extreme cold or heat.

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Mixer Manufacturers Bureau

Affiliated with the Associated General Contractors of America, Inc.

CHAIN BELT COMPANY
Milwaukee, Wis.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

THE FOOTE CO., INC.
Nunda, N. Y.

THE JAEGER MACHINE CO.
Columbus, Ohio

THE KNICKERBOCKER CO.
Jackson, Mich.

KOEHRING COMPANY
Milwaukee, Wis.

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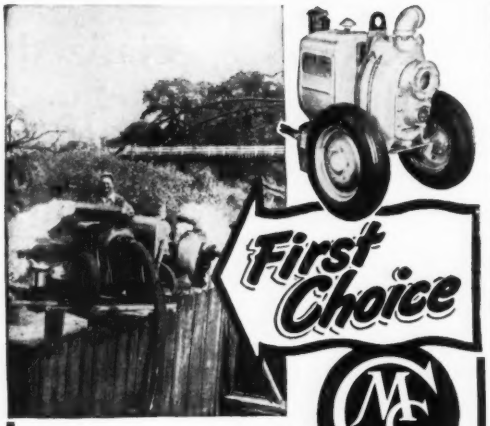

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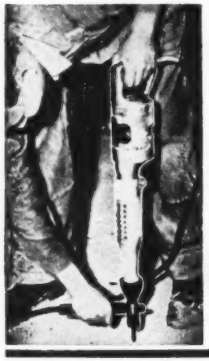

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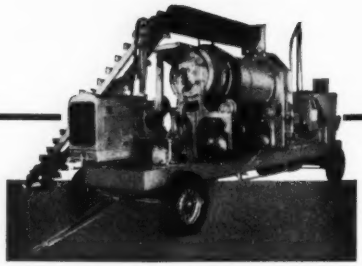

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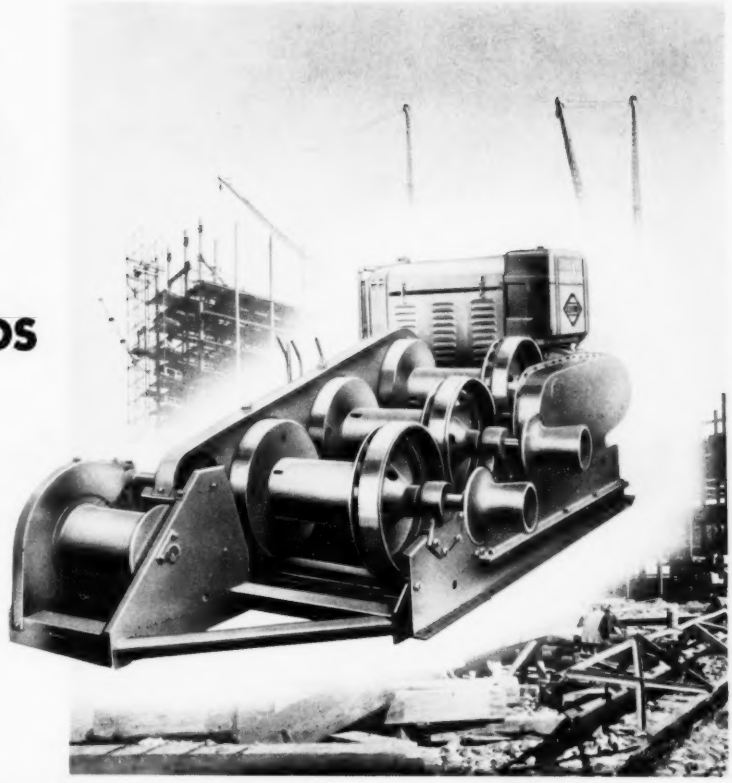

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CLYDE BAND FRICTION HOIST

The ease of operation of Clyde Band Friction Hoists permit the operator to concentrate all of his attention on the *safe, sure, accurate* spotting of loads. Convenient and easily-operated controls practically eliminate fatigue . . . and the consequent slowing down and dangerous operations by a tired-out operator. *Smooth, positive* engagement and release eliminate shock loads on cable and hoist and give *split-second control* at all times!

Clyde Band-Friction Hoists are available in one, two and three drum models with nominal line pulls to 21,000 lbs. and line speeds to 400 f.p.m.

Circular MP-48 gives complete information and specifications on these hoists . . . time savers and money makers for all construction jobs. *Write for it TODAY!*

Clyde Internal Friction Bands Dissipate Heat
FASTER, LAST LONGER, ADJUST EASIER!

Friction bands on Clyde Hoists are inside the friction drum, thus permitting the heat to be carried away as it is generated — something impossible when the band surrounds the outside of the drum and virtually forms an insulating blanket around the heat generating surfaces.

At those infrequent times when adjustment needs to be made, it can be done simply and quickly! FRICTION LININGS CAN BE REPLACED WITHOUT REMOVING THE DRUMS! Check all the advantages of a Clyde Band-Friction Hoist before you purchase ANY hoist!

WHIRLEYS • DERRICKS • HOISTS • BUILDERS TOWERS • CAR PULLERS • HANDI-CRANES • ROLLERS

CLYDE

ESTABLISHED 1899

CLYDE IRON WORKS, Inc.

DULUTH 1, MINN

Subsidiary of Barium Steel Corp.